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Railway Age

FIRST HALF OF 1922—No. 1 NEW YORK—JANUARY 7, 1922—CHICAGO SIXTY-SEVENTH YEAR

Published weekly by Simmons-Boardman Pub. Co., Woolworth Bldg., New York, N. Y. Subscription Price U. S., Canada and Mexico, $6.00; foreign countries (excepting daily editions), $8.00; single copies, 25c. Entered as second-class matter, January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.

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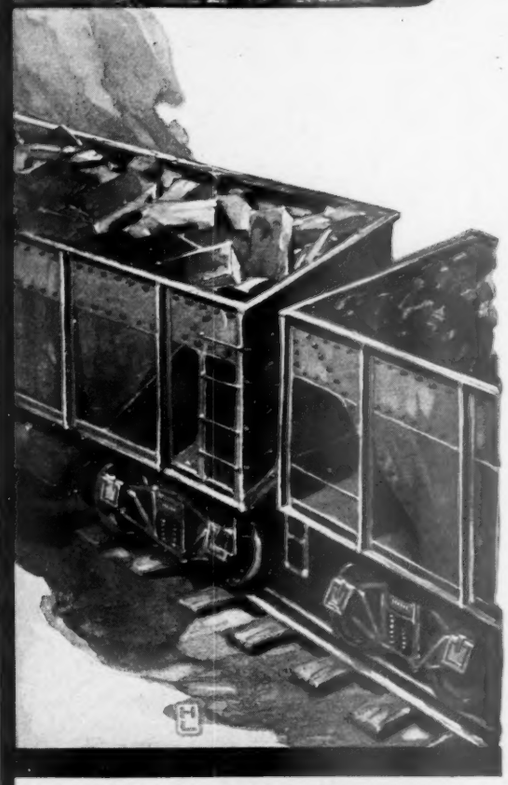

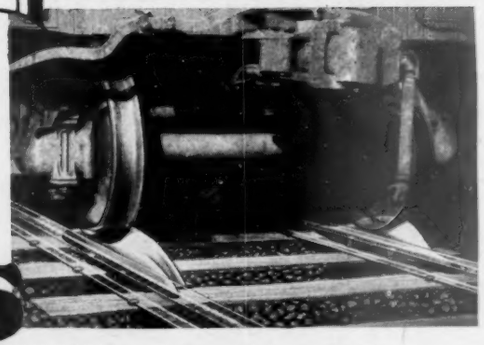

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EDITORIAL
Railway Age

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The Worst Railway Year in History

THERE HAVE been bad years in the history of the railways of the United States before. In most respects 1921 was much the worst of all.

The declines of freight and passenger business were much the greatest ever known. The percentage of net return earned on the property investment shown by the companies' books was the smallest ever known except in 1919 and 1920, and of course in 1919 and most of 1920 their net returns were guaranteed by the government. For the twelve months ending with October 31, 1921, the net return earned on property investment was less than 2.75 per cent, and it is not probable the net return for the 12 months of the year 1921 will be found to have been any larger when the complete statistics are available. The smallest percentage of net return ever earned before in a year when net returns were not guaranteed was in 1894, when the largest slump in business previous to 1921 occurred, and when the net return earned on property investment was 3.2 per cent.

It is no exaggeration to say that throughout the year a large part of the companies were struggling to keep out of bankruptcy. The Bureau of Railway Economics estimates the year's net operating income of the Class I roads at $616,000,000. This will not meet their fixed charges, which are: Interest, $477,000,000; rentals, $129,000,000; other charges, $34,000,000; total, $640,000,000. Many roads failed to earn enough to pay their interest.

Under such conditions it was impossible for most railways adequately to maintain their properties, much less make additions or improvements. The *Railway Age's* annual compilations of statistics, published elsewhere in this issue, show that the amount of new mileage built was the smallest in history since such records have been kept, except in 1920; that the mileage of railway lines abandoned was the largest in history, and that new low records were set for the acquisition of new equipment.

The number of new locomotives ordered for domestic service totaled only about 250, the number of freight cars ordered only slightly over 20,000, and the passenger car orders something over 200. With one or two exceptions the equipment ordered and built figures for 1921 are the lowest on record.

These statistics are very significant, but they acquire increased significance when compared with corresponding statistics for past periods of years. Prior to the adoption of government control in 1918 the number of freight cars scrapped annually had for some years been about 100,000, or almost five times as great as the number ordered in 1920. In the five years ending with 1917 the number of freight cars ordered was regarded as small compared with former years, but it averaged 108,000 a year, or more than five times as great as it was in 1921. The number of locomotives ordered in the five years ending with 1917 was regarded as comparatively small at the time, but it averaged almost 2,400, or ten times as much as the orders placed in 1921.

One who judged entirely, or even mainly, by the foregoing facts would be obliged to conclude that railroad transportation in the United States is a dying industry. Fortunately, however, this cloud, like most clouds, has a silver lining. The conditions in the business were relatively at their worst in the early part of the year, and grew better as the year advanced. In January and February the railways as a whole not only did not earn any net return, but incurred operating deficits. Drastic retrenchments and the reduction in wages granted by the Railroad Labor Board caused the net operating income to improve, until in October it amounted to $108,500,000. The operating ratio declined from 95 per cent in February, to 74 per cent in October. There was a sharp decline of freight business in November and December and these months will make bad showings, but throughout the entire year the tendency of operating costs was downward. Wages were reduced, improvements were made in the rules and working conditions of employees, and the prices of fuel and materials declined.

In consequence, the railways have entered the year 1922 on a lower basis of operating costs. The reduction of costs has been inadequate, but it is reasonable to assume that they will continue to decline. Under the conditions existing it is impossible to believe that the Railroad Labor Board will hesitate to grant further reductions of wages. Furthermore, it seems reasonable to assume that in 1922 there will be a gradual recovery of business from its present low level, and this is what the railways need more than anything else. Of course, however, whether there will be an increase of business is purely speculative, and will be determined mainly by developments and conditions entirely outside the control of the managements of the railways. It is evident, therefore, that the only road to safety for the railways is to continue to make the greatest efforts to secure further reductions in their operating costs, and especially in their labor and fuel costs.

If the darkest hour of all the night is just before the morning light, then the railways should soon begin to see the morning light. Certainly they never passed through a darker night than the year 1921.

While the year was marked by relatively the smallest amount of improvement work and the smallest volume of purchases ever known, there was a marked increase of orders for equipment and materials toward the close of the year, when the net earnings were becoming more favorable. This

showed that the managements were fully awake to the need for doing more improvement work and acquiring more equipment as rapidly as they became financially able. The country sorely needs a readjustment of conditions which will enable the farmers to increase their purchases. Next to that the principal requisite for a revival of prosperity which will be real and lasting is the restoration of the earning power of the railways and of their ability to make normal purchases.

The Work of the Railroad Labor Board

Proceedings before the Railroad Labor Board were the center of interest in the railway field a large part of the time during 1921. The board has had presented to it for solution some of the most highly controversial, complicated and difficult problems ever submitted to any government body. It received much criticism from numerous sources regarding the way it dealt with these problems. Many of the criticisms made were directly contradictory to each other. In spite of the numerous criticisms passed on it, and even demands from influential interests for its abolition, it appears that on the whole the board's prestige was higher at the end than at the beginning of 1921.

It is only fair to recognize that the provisions of law under which the board acts, and the work of the board itself, must be appraised separately. The Transportation Act both specifies what the board must do and prescribes the conditions and fixes the limits of what it can do. The board should not be criticised for doing what the law requires it, or for refraining from doing what the law does not authorize it to do.

One of the most important controversies the board had to settle during the year was that over the national agreements. The board tried to act in accordance with the demands of the railways that rules and working conditions of employees should be made by direct negotiations between the individual railways and their own employees. When, however, it remanded the rules and working conditions to negotiation between the individual railways and their employees the heads of the labor unions made the negotiations almost fruitless by directing the general chairman of the unions on the individual lines to accept nothing less than the rules of the national agreements. The individual railways and their employees being unable to agree, the Labor Board was practically forced by the provisions of the Transportation Act to fix most of the rules and working conditions itself. It was impracticable for it to fix different rules and working conditions for every individual railway. As a practical matter it had to make rules of national application. In formulating these rules it seems on the whole to have done as well as it could in the circumstances. The rules made by it are a great improvement over those contained in the national agreements.

It is doubtful, however, if the board acted wisely, or even legally, in the case of the Pennsylvania. The management of the Pennsylvania and representatives of a majority of its employees at the Altoona shops reached an agreement. The board held this illegal on the ground that the road had not dealt with representatives of the labor unions concerned on the entire Pennsylvania System, who included in their membership a majority of all the shop employees. The question involved is one regarding the correct interpretation of the law. It has been taken to the courts and it is to be hoped the courts will settle it.

Another question of great importance upon which the board had to pass was that of a general reduction of wages. The railways, being in serious financial straits, asked it in substance to wipe out the entire advance in wages granted by it on July 20, 1920, and which was made effective from May 1, 1920. The board granted a reduction effective on July 1, 1921, which, however, did not seem then, and does not seem now, to have been as large as the conditions existing demanded and the provisions of the Transportation Act warranted. The cost of living in the United States, according to the best authorities, is now only about 52 per cent more than it was in 1916, while since the reduction in wages was made the average hourly earnings of railway employees working on an hourly basis are 121 per cent more than in 1916.

The failure of the board to make a larger reduction of wages has been harmful to almost everybody concerned, including many railway employees themselves. It has rendered it necessary for the railways to incur the odium of maintaining the present freight rates in spite of a general demand for reductions; it has helped to render it impossible for the railways adequately to increase their net income; it has helped to force them to continue a policy of the most drastic retrenchments in maintenance; and it has rendered it necessary for them to refrain from taking back into service many thousands of employees who otherwise would have been used in maintenance work. The railways intend to ask the board for further reductions in wages and it is difficult to see how, under existing conditions, it can refuse to grant them.

One of the most acute problems presented to the board for solution arose when the train service employees issued their order for a strike in October. It is difficult to say whether public sentiment, the attitude of the Department of Justice or the activities of the Railroad Labor Board contributed the most toward preventing the strike. At any rate, the board contributed largely. The board issued a statement at the time saying that the employees were crossing bridges long before they could get to them, since the board intended to dispose of all cases involving the rules and working conditions of any class of employees before it heard any case involving the wages of that class. This statement was generally interpreted to mean that the board would postpone for months hearing any case for reductions of wages. The *Railway Age* refused at the time to put any interpretation on the statement, saying that was for the board itself to do. Subsequently members of the board have announced that all cases involving rules and working conditions have been disposed of and called attention to the fact that no case involving wages on any large railway is before it.

It is almost two months since the railway executives met in Chicago and announced their intention to ask for further reductions of wages. It will take weeks, or even months, for

the evidence to be heard and a decision to be reached after the applications for reductions are in. Apparently developments are vindicating the statement of the situation issued by the board to help avert the strike, in spite of all the criticisms of it that were made at the time.

The board has shown an unfortunate tendency to try to make itself the labor manager of all the railways. An extreme example is afforded by its decision in the case of a locomotive engineer on the Northern Pacific who was discharged for entering a yard with a train of 80 empty cars at a speed of 40 miles an hour. That he did this was testified by the division superintendent who witnessed the incident. On petition of the railway brotherhoods a majority of the Labor Board ordered that the engineer should be reinstated "providing he shall give assurances to proper officials of the carrier of his willingness to abide by the rules." A dissenting opinion was filed by the chairman and all three railway members of the board, who said: "In deciding to change or mitigate the discipline administered by the carrier with its better knowledge of all the surrounding circumstances, the Labor Board has assumed a responsibility not contemplated by the Transportation Act, and has taken a step which tends to the breaking down of proper and necessary discipline on all carriers." If the board in future cases follows the precedent established in this one, it will have to substitute itself for the railway managements in assuming responsibility for widespread violations by the employees of the rules adopted to insure efficient and safe operation.

The public members of the board hold the balance of power. Their personnel was greatly strengthened when President Harding appointed Ben W. Hooper, former governor of Tennessee, a member. Mr. Hooper has shown that he is a man of unusual ability, initiative and courage. Because of his energy and ability, because of his appointment by President Harding, and of other circumstances which it is not necessary to mention, it is apparently no exaggeration to say that Mr. Hooper holds the balance of power on the board. This paper believes, and has said it believes, he has made some serious mistakes. These mistakes, however, apparently have been mainly due to Mr. Hooper's lack of knowledge of railroad affairs. This is not said in any spirit of depreciation of him, since his training and experience had given him no opportunity to get a broad knowledge of railway matters. He is eminently capable of acquiring the knowledge of railway matters that he needs, and in view of the developments of recent months, it is evident that in the year 1922 he is going to have a very important part in determining for either good or evil the policy of the board.

Greatest Traffic Slump in History

THE DECLINE of both freight and passenger traffic in 1921 was the greatest, absolutely and relatively, that ever occurred in this country. The net ton-miles of freight service rendered in the first ten months of the year were 23 per cent less than in the first ten months of 1920. If returns for October and November show a decline of traffic in those months relatively as great, the total revenue ton-miles for the year will be only 344,000,000,000, compared with 446,000,000,000 in 1920. The freight handled during the year was just about equal to that handled in the year ended June 30, 1916, over five years ago.

Since the statistics of the Interstate Commerce Commission have been compiled there have been four substantial declines of freight business. The freight business handled in 1894 was 14.50 per cent less than that of 1893. The freight business of 1908 was 7.7 per cent less than that of 1907. There was a small decline of business in 1910. In 1914 the freight business declined 4.3 per cent, and it declined further in 1915, making the amount of business handled in 1915 almost 9 per cent less than in 1913. The amount of freight business handled in 1919 was almost ten per cent less than in 1918.

Thus it will be seen that the largest slump which ever occurred before was in 1894 and amounted to 14.50 per cent, as compared with about 23 per cent in 1921. Table I gives the statistics regarding revenue ton-miles in 1921 by months, January to October, inclusive. The comparatively small decline shown for April was due to the fact that in April, 1920, the movement of business was seriously hindered by the switchmen's strike. It will be seen that, as compared with corresponding months of the previous year, the slump proceeded with accelerating rapidity until July, when the business handled was 29.50 per cent less than in July, 1920.

TABLE I

TON-MILES (MILLIONS) BY MONTHS, JANUARY TO OCTOBER, INCLUSIVE, 1920 AND 1921

	1920	1921	Per cent decrease
January	34,964	29,817	15
February	32,958	24,915	24
March	37,865	26,831	29
April	28,592	25,582	10.5
May	37,892	28,221	25
June	38,246	28,144	26.5
July	40,232	28,414	29.5
August	42,656	30,387	29
September	40,651	30,825	24
October	42,252	36,506	16
Total	376,308	289,642	23

TABLE II

REVENUE PASSENGER MILES (MILLIONS) BY MONTHS, 1920 AND 1921

	1920	1921	Per cent decrease
January	3,501	3,358	4
February	3,174	2,857	9.9
March	3,530	3,056	13.5
April	3,552	2,833	20.2
May	3,761	2,969	21
June	4,149	3,215	22.5
July	4,785	3,637	24
August	4,988	3,623	27.3
September	4,294	3,291	23.4
Total	35,734	28,839	19.3

The decline in passenger business was almost as great in were first compiled there have been four substantial declines months of the year was 19.3 per cent less than in the same months of 1920. The greatest slump in passenger business that ever occurred before was in 1895, when the passenger mileage was 14.50 per cent less than in 1894. There was a decline of eight per cent in passenger business in 1915.

These are the only important declines of passenger business that have occurred. In 1919, when freight business fell off, passenger business substantially increased.

The decline in passenger business by months in 1921 is shown in Table II. The decline in passenger business steadily became relatively greater, month by month, until and including August.

There can be no question that these unprecedented declines of freight and passenger business were due mainly to general business conditions. A relatively small part of them may also have been due to the fact that large advances in both freight and passenger rates were made late in 1920, just when the greatest decline of commodity prices ever known was beginning. It is probable that the advances in passenger rates had more effect on traffic than the advances in freight rates. People ship freight for purely business reasons, and the rates are relatively so small a part of the prices of practically all commodities that if a market can be found for the commodities a comparatively small difference in freight rates will not prevent them from moving. On the other hand, a great deal of traveling is done for pleasure, and the fact that passenger rates are regarded as high doubtless has had a tendency in many cases to prevent people from making trips which they otherwise would have made.

How long will it take to recover from this slump? This is a question which many are asking and which nobody can answer. Experience following past slumps may be interesting, however, even if it is not instructive. After the panic of 1893 the railways never handled a freight business equal to that year's until 1896. Each of the other declines of business was followed by a quicker recovery. The freight business of both 1908 and 1909 was less than that of 1907, but that of 1910 exceeded that of 1907. The small decline in 1911 was followed by large increases in 1912 and 1913. The business handled in both 1914 and 1915 was less than in 1913, but that of 1916 again set a new high record. The slump in 1919 lasted only a year, the business of 1920 being the largest up to the present time.

If one judged entirely by past experience he would be justified in expecting the business handled by the railroads in 1922 to be considerably larger than in 1921, but to be smaller than in 1920, and perhaps even smaller than in 1918. However, since the decline of business has been so much larger, both absolutely and relatively, than ever was known before, it would be most hazardous to venture a prediction as to how long it will take for a complete recovery to be made.

Entering Another Year of Struggle

THE YEAR 1921 was one of constant, and even desperate, struggle in the railroad business.

It was a year of struggle to reduce operating expenses. In the first ten months of the year total expenses were reduced $923,000,000 as compared with those of the same months of the preceding year. If the results for the entire year show a corresponding reduction it will amount to $1,100,000,000.

Reductions of maintenance expenses may be real or merely nominal. Reductions of transportation expenses are always real. While total operating expenses were reduced 19 per cent in the first ten months of the year, transportation expenses were reduced more than 23 per cent, or relatively more than the decline of traffic. The railway managements made real progress in their struggle with expenses.

It was a year of struggle to prevent a hostile and unfair public sentiment regarding private management of railways from being formed. More misleading and downright false propaganda against the railways was disseminated than in many years. Most of it came from spokesmen and organs of the railway labor unions who were engaged in trying to blacken private management to promote the Plumb plan. Unfortunately, this propaganda had some effect on public sentiment. The necessity the railways were under of charging relatively high rates in a year of falling prices and profound business depression added greatly to the difficulties of keeping public sentiment reasonable and friendly.

Hard as was the struggle in 1921, it is to be feared it will be equally hard in 1922. The efforts to reduce operating costs will have to be continued without relaxation. It will be necessary to try to obtain further reductions of wages, and this will tend to have an unhappy effect upon the attitude and morale of employees. The agitation for general reductions of railway rates undoubtedly will be continued, and the greatest efforts will have to be made to prevent premature and excessive reductions.

The year 1922 apparently will deal railway officers a bad hand. It is an old saying, however, that credit belongs not to the man who wins a game of cards, but to him who plays well the hand that is dealt him, whether good or bad. It is not whether a man wins a fight, but how fairly and how well he fights that counts to his credit or discredit.

Railway officers made a splendid and successful fight in 1920 to move the largest traffic ever offered. They made a splendid, efficient and courageous fight in 1921 to reduce operating expenses and prevent reductions of rates that would have been ruinous.

What the year 1922 will bring forth nobody can now foretell. That will depend very largely upon conditions beyond the control of railway officers. But railway officers can and will "carry on" with the same energy, loyalty and courage as in 1920 and 1921.

They will be fighting this year largely to determine the future of railway ownership and management in this country. They should spare no effort to make the operation of the railways as efficient and economical as possible. At the same time they should meet the selfish, malicious and misleading propaganda against private management which is coming from so many sources with redoubled courage and energy. If private management is to be made successful and to be perpetuated railway officers apparently will have to imitate the American pioneer who worked with one hand upon the plow and the other upon his rifle.

The year 1922 can be made the most memorable in railway history if railway officers will mightily resolve to run the railways as well as they can, and at the same time to return blow for blow to everybody who unfairly attacks them.

Executives Review Railway Prospects for 1922

The Background of Conditions During 1921

By Thomas DeWitt Cuyler
Chairman, Association of Railway Executives

DURING THE YEAR 1920, the chief effort of railway management was necessarily upon the improvement of the physical maintenance of the railroads and breaking up the congestion of traffic by intensive loading and movement. Hardly had the backbone of traffic congestion been broken, in October, before the general rate of business activity began to diminish and railroad traffic to decline.

So rapid was this decline that in January and February of 1921, the railroads could not even earn their operating expenses, and it became obvious that the great task before management in 1921 was to reduce the operating expenses of the railroads, and to restore their earning power, at least sufficiently to keep them out of bankruptcy.

This effort ran along two lines—one, to increase the productivity of employees by getting rid of the national agreements and other burdensome rules and working conditions, and the second consisted in a reduction of basic wages.

Wage and Freight Rate Reductions

The desire of railway management was to secure the first relief by an increase in the productivity of employees, postponing a reduction in basic wages until a later date. The relief which they actually secured came in just the reverse order. A reduction in basic wages, amounting to approximately 12 per cent, became effective on July 1, but it was late in 1921 before the railroads began to receive any relief from burdensome rules and working conditions.

Between the reduction in wages, effective July 1, and a very severe cutting of maintenance expenditures, the railroads will probably make for 1921 a net operating income between $550,000,000 and $600,000,000. This will mean that interest on funded and unfunded debt can be met, but that normal dividends will not be earned.

With the more or less rapid and unequal fall in commodity prices, the relation of freight rates to commodity values became of increasing importance as the year 1921 progressed, and led to widespread demands for reductions in rates. In meeting this situation the railroads, of course, had no war-time profits to fall back upon. They were at the same time operating under costs, nine-tenths of which had been set by governmental authority, directly or indirectly, and they had no ability to make rapid changes to meet changing economic conditions. It has been and is, however, the earnest intention of the railway executives to get railway transportation and railway rates as rapidly as possible back into a normal relation to the industry and agriculture of the country. They can do this, however, only step by step.

Some misunderstanding in the public mind may have been occasioned by the inability of the railroads to translate their wage reduction of July 1 into rate reductions. It must be remembered, however, that when the increase in rates was made in 1920 it was expected to give the railroads a fair chance at a 6 per cent return, on the basis of a flow of traffic such as the railroads experienced at the end of 1919 and for the greater part of 1920. With the enormous decline in business activity, the rates established by the Interstate Commerce Commission did not produce the return contemplated, and many railroads would not have been able to earn even their fixed charges during 1921 had it not been for the wage reduction of July 1.

Under these circumstances it was, of course, impossible for the railroads to make general rate reductions predicated upon this wage reduction. As, however, their situation improved, during the second part of 1921, the railway executives attempted to find a method whereby the desire of the country for lower rates could be gradually met. They feel that they have found this method in the action adopted at their meeting of October 14, when they decided to request another reduction in basic wages, and undertook to turn over to the public in the shape of reduced rates the full benefit of this reduction. This policy recognizes that the cause of high rates is high operating expense, and that the chief item in excessive operating expense is excessive labor cost.

Earning Power Must Be Restored

Of the threatened railroad strike in October, little need be said. The reaction of public opinion to this threat was one of the most hopeful indications that this country is going to work its way back to normal conditions in accordance with fundamental American principles.

The chief danger in the present situation is that the great body of our people may overlook for the moment the importance to them of allowing the railroads to get back on their feet financially. Yet this in itself would make a very substantial contribution toward resumption of normal business. The railroads are the country's largest single industry; they consume about a third of the normal product of the coal and steel industries; and are large consumers in many other lines. There is a substantial deferred maintenance carried over from the period of federal control, and probably as much deferred maintenance accrued during the present year. In addition, by causes outside of the control of railway management, the railroads have practically been in a condition of arrested development now for some years past. Without in the least denying the desirability and ultimate necessity of substantial reductions in railroad rates, it is sincerely to be hoped that shippers will not demand, and that the Interstate Commerce Commission will not require, from the railroads rate reductions so great as to make it impossible for the railroads to restore their earning power during the coming year, and to assume their normal place as the greatest single consumer of the products of other industries.

How to Better Railroad Conditions

By J. Kruttschnitt
Chairman of the Southern Pacific Company

YOU ASK: 1. *What can and should be done by railroad managements to better existing railway conditions?*

Railroad managers will continue to exercise the close watch over expenses that in 30 years has resulted in handling *four times* the traffic units in 1920 that were handled in 1890, in *two-thirds less train miles* than 1890 operating conditions would have required. The annual savings each year compared with 1890 were large, the cost of handling the enormous traffic of 1920 being $6,742,000,000 less than the cost of handling it by 1890 methods. This *saving* is $633,000,000 *more than the entire operating expense* of the railroads in 1920 notwithstanding high cost of wages and materials. Without adequate revenues and improved credit, which the Transportation Act was designed to produce, but which it has not been allowed to do, little can be done to reduce operating costs by elimination of curves and reduction of grades and distances, but managers must seek to improve technical details of manufacture of rails, castings and other materials; and of locomotive design, so as to reduce consumption of fuel, and to convert more of the heat energy in fuels into useful work by the free use of appliances of merit, with such little control over operations as remains in their hands.

2. *What can and should be done by railroad regulating authorities to better the railroad situation?*

(a) The Transportation Act, 1920, passed after years of close study and bitter experience, was designed to nourish and restore the railroads that had been starved well nigh to dissolution by a generation of repressive and punitive regulation, and to enable them to provide adequate facilities for the public by constructing new and improving existing lines. The effect of the long period of punitive regulation is reflected in the construction of only 314 miles of new line in 1920 compared with 717 *miles in* 1841, *eighty years ago;* and the effect of preventing the Transportation Act from functioning is shown in the authority granted by the Commission to *abandon* and *scrap* 764 *miles of railroad* in 1920, and in the low income returns on the value of the properties since September 1, 1920.

Month		Net Income Earned (Annual Basis) Per Cent.
September,	1920	4.1
October,	"	4.6
November,	"	3.3
December,	"	0.7
January,	1921	Def.
February,	"	Def.
March,	"	2.2
April,	"	2.1
May,	"	2.3
June,	"	3.0
July,	"	4.5
August,	"	5.0
Average		2.9

(b) The Transportation Act concentrated rate regulation in the Interstate Commerce Commission and empowered it to prevent conflict of state with interstate rates. A bill is now before Congress to repeal this power; another seeks to reduce the 6 per cent rate of return.

(c) The Transportation Act created a board to control wages. Obviously there should be close co-ordination between the revenue and expense controlling bodies, the Interstate Commerce Commission and the Labor Board, in order to insure the statutory net income of 6 per cent; but we have seen one of these agencies reduce freight rates regardless of labor costs fixed by the government and of material costs fixed by economic conditions, and another fix fictitious scales of wages, violating economic laws and regardless of the ability to pay them. The framers of the Transportation Act meant well, but their intentions are defeated by faulty administration. To insure perfect co-ordination it is imperative that the same agency that controls revenues should also control expenses.

(d) There should be an immutable rate-making policy. For many years when prosperity was rampant and all industries were making large profits, those of railroads alone were restricted by law; increases of rates were denied, while increasing costs were steadily reducing the margin between income and expense. Financial starvation was to be checked by the Transportation Act, but before its influence could be felt the depression in business had set in and the rate increases allowed September 1, 1920, at the end of the guarantee period, were offset, first, by many reductions made voluntarily by the carriers to correct inequalities in the horizontal increase of rates, and thereafter by others made by the Interstate Commerce Commission, notwithstanding the statutory return on the value of the railroads had never been enjoyed and they were physically and financially unable to stand the reductions. During the years when business could easily have stood them, the applications of the railroads for higher rates were repeatedly denied, and now when business can ill afford to pay existing rates and the railroads can still less afford to reduce them they nevertheless are reduced, and the owners of railroads are required to relieve those who feasted while they fasted. The enumeration of the troubles of the railroads indicates the remedies:

1. Place the regulation of wages and the regulation of income under the same agency.

2. Adopt a fixed policy of rate-making.

3. Protect the first and only constructive railroad legislation the Congress has ever passed; save it from being destroyed by amendments.

4. In their own interest the people should not permit the light traffic enjoyed by the railroads under stagnant business conditions to be further reduced by agencies created and nourished by taxes gathered from all the people, as is being done by government-owned ships using the Panama canal on ridiculously inadequate tolls; by government-owned and operated towboats and barges on the Mississippi and Warrior rivers quoting rates of 20 per cent below railroad rates; and by motor trucks on free highways paralleling the railroads, and provided by state and federal moneys. A bill has been introduced in Congress authorizing the government to lend money at 5 per cent to assist corporations in organizing highway motor transportation to compete with existing transportation lines, the obvious purpose being to destroy the value of railroad investments, as the loan is to be contingent on

the business of the proposed corporations offering *"reasonable hope of success."* In 1920 the people through their representatives pronounced overwhelmingly against government ownership; unless their policy towards the railroads is radically changed the people will defeat their own will and make private ownership and operation impossible.

Some of the Hopeful Signs

By A. H. Smith
President, New York Central Lines

THE present railway situation represents progress under the Cummins Act toward the restoration of the character and cost of service and railway credit formerly enjoyed, with the ultimate hope that the former record shall some day be surpassed and thus truly serve the general welfare.

If each factor—investor, official, employee, patron and regulator—will do tomorrow better than he has done today within the field of duty, it will be a splendid groundwork on which to expect fruition.

Why should the railway situation get worse when such a policy can be? Are there not many now imbued and working with this aim? Is not the burden of taxation and public spending curtailed? Do we lack the normal yield of the earth's increase? Are there not hopeful signs to be read in current trend of international relations?

If these are grounds for faith—and I think they are—it is a good sign.

However, the country has been on a level of spending which it cannot long sustain. It is shaping its descent from these flights to return to a sound sense of normal value. Conditions, including rates, inherent to the evolution from the war state of affairs, will no doubt retard the rate at which we approach the aim.

It may well be so, because there is much to do that must be done well in order to be right and endure.

The Railroads' Hope Lies with the Public

By C. H. Markham
President, Illinois Central

I BELIEVE we should not be discouraged over the railway outlook for 1922. Some aspects of the situation are disheartening, but I have an impelling faith in the soundness of American business and the fairness of the American public, and that faith will not allow me to lose heart over the gloomy phases of the situation.

The railroads of the country, in common with all other business institutions, have had a most eventful year. The demands made upon the railroads by changing economic conditions have contributed to an unusual extent in making it impossible for the railroads to follow out carefully developed plans. More than ever before, the railroads have been forced to live from month to month, hoping, oftentimes in vain, for the clouds to clear away and disclose a brighter prospect. Many plans for development have had to be postponed; even the normal demands for maintenance of properties have had to be deferred by many roads. More than three years have elapsed since the signing of the armistice, and the railroads have not yet been freed from the incumbrances which the war placed upon them.

We should recognize frankly that the changes which have come in public opinion during the year have, in many cases, not been for the best. A year ago the public had accepted a great increase in railway rates and public sentiment was arrayed solidly behind the railroads in their efforts for a rehabilitation of their organizations and their plants, which had been devastated by the war. There are gaps in that array of public sentiment now. In many quarters active support has lapsed into indifference. The lessons taught by the transportation shortage of the latter part of 1920 seem to have been forgotten. The public has not actively concerned itself with the news that railway earnings throughout the year have been insufficient. Economic changes have lent themselves to a widespread agitation for a lowering of rates in the face of insufficient earnings and the lack of an adequate return has not permitted the roads to fortify themselves for the business revival which is certain to come.

A year ago government control of the railroads had lost almost its entire following. It has not regained many of its lost adherents during the past year, but its followers are awaiting the first sign of the railroads' inability to handle all the business offered to press their demands. Government ownership will not come as a carefully thought out and rationally adopted plan of action, but we should be on our guard lest it come as a possible way out of a situation into which we are fast drifting.

I said that I have an impelling faith in the fairness of the American public, and I believe that our hope lies with the public. We have a situation before us with which we should be acquainting the public. The railroads must be assured of earning a fair and reasonable return upon their valuation, not alone as a matter of simple justice to the millions who have directly and indirectly invested their savings in and made the railroads possible, but in protection of future railway development and progress. The public must be brought to realize its great stake in the railroads, and it lies with us to give the public that vision.

We are facing many pressing problems as we enter upon another year, but there is none more pressing than this duty to guide public thought into channels which will make possible a rail transportation system capable of serving the public efficiently and adequately.

General Review Section

General Railroad Development During the Year. By Harold F. Lane.

Five Years of Freight Traffic Growth Is Lost. By Harold F. Lane.

The Regulation of Securities Under Section 20a. By Roberts Walker.

The I. C. C. Regulation of Security Issues. By Harold F. Lane.

Normalcy in the Labor Situation Still Far Away. By Holcombe Parkes.

The Federal Valuation Is Entering New Stages. By E. T. Howson.

Status of Railroad Accounts with the Government. By Harold F. Lane.

Railroads Profit from Lower Material Costs. By W. S. Lacher and C. B. Peck.

Improved Service and Morale Features of 1921. By Charles W. Foss.

Recent Tendencies in Locomotive Development. By R. C. Augur.

Many Special Types of Cars Introduced in 1921. By A. F. Stuebing.

Maintenance-of-Way Is Now on the Upgrade. By W. S. Lacher.

Cutting Freight Loss and Damage Claims in Half. By K. H. Koach.

Mandatory Rules Feature 1921 Accounting Progress. By Charles W. Foss.

Equipment Conditions Show Dangerous Tendency. By A. F. Stuebing.

Electrical Developments for the Year 1921. By A. G. Oehler.

Repair Shop and Engine House Development. By E. L. Woodward.

Chronological Review of the Year's Activities. By J. E. Cole.

Railway Executives at the White House—Left to Right, Front Row: S. M. Felton, Howard Elliott, T. De Witt Cuyler, A. P. Thom, C. H. Markham, Samuel Rea, R. S. Lovett. Back Row: J. Kruttschnitt, Ivy Lee, A. H. Smith, Hale Holden, W. B. Storey, Secretary of Labor Davis, W. W. Atterbury.

General Railroad Developments During the Year

The Principal Events Center Around the Efforts to Reduce the Cost of Transportation

By Harold F. Lane

A REVIEW of the developments of 1920, published in the *Railway Age* of a year ago, began by saying that it consisted largely of an account of the measures that had been necessary "to enable the roads to recover from the effects of the war and 26 months of unified operation by the government and of the process of readjustment to the new conditions created by the Transportation Act." A similar review for 1921 can only report further progress, as the process of readjustment is taking longer than was generally considered would be necessary, and is still far from complete.

In the case of the railroad industry, this readjustment has been complicated by the fact that its adjustment to the war period conditions had been delayed to the last and had hardly been completed when the period of deflation for other industries set in. As a result the railroads have been subjected to a tremendous pressure and much criticism because of their inability to respond promptly to the forced deflation in many other lines. The principal events of the year have centered around the manifestations of this pressure and the efforts of the railroads to meet it.

Throughout the greater part of the year, the railroads, under high rates and with a volume of traffic which, although much below that of the last three years, would have seemed big before the war, and with large sums still owing them from the government, were engaged in a desperate struggle to keep out of bankruptcy. As their condition has gradually improved during the year, the struggle has been almost as desperate to retain that position until they could work out the readjustment of their operating expenses necessary to comply with the universal demand for rate reductions.

Rate Advance Too Long Delayed

One of the reasons for the commandeering of the railroads by the government was to prevent the inflation in the transportation industry which had manifested itself in other lines. Instead of allowing the railroads to increase their rates in proportion to the increase in cost caused by the inflation of prices and wages in the unregulated industries, an element in the administration allowed itself to be persuaded that in the case of the railroads it could arrest this tendency by operating the railroads itself much more cheaply, as well as more efficiently, under a unified management than they could be operated by their owners.

THE RAILROADS, in the face of falling traffic, were in no position to come to the assistance of other industries by reducing rates until their own costs could be adjusted. Only the most rigid economies enabled them to avert bankruptcy.

Plans for a new wage cut are under way and the Interstate Commerce Commission has begun an investigation as to what, if any, further rate reductions may be ordered.

The experiment failed, but as the Railroad Administration was not under the necessity for keeping itself on a self-sustaining basis, since any deficiency in the amount necessary to meet its guaranty to the roads could be met from Congressional appropriations, it failed to adjust the rates to the level of expenses that it found imposed upon it. After it had been decided that the experiment was to continue no longer, even the wage adjustment was postponed and passed along with the rate problem to the private managements. The cycle of wage increases was, therefore, not completed until July, 1920, although the wages then awarded were made retroactive to May 1 and the adjustment of the rates was not made until August 26. Even then there was little complaint of the high cost of transportation, because it was not high in proportion to the levels that had been reached by prices generally. The most representative shippers of the country had even urged a generous increase in the hope that it would give them the service they needed.

By the time the force of the post-war boom had spent itself, however—and it is now clear that this had begun to occur even before the date of the rate increase—the inflation of railroad costs and rates took on another aspect and many business men who had felt they could afford to be "generous" to the railroads in the summer of 1920, wanted to take it back by January, 1921. Although the high tide of traffic, to some extent retarded early in the year 1920 by the switchmen's strike and the car shortage, continued during

the last four months of 1920, the first weeks of 1921 showed that a period of depression had set in and the railroads were at once faced with a demand for readjustment at a time when their own condition least justified such a course and within only four months of the time when their rates had been placed on a sustaining basis.

For eight months of 1920 the railroads had been guaranteed, but the actual payment of much of the guaranty had been delayed. They had actually earned practically no net operating income for the entire year in which they had broken all records for the volume of freight and passenger business handled. Although they had a net of some $225,000,000 for the four months after the rate increase, and after their guaranty had expired, the new rates had been in force such a short time as to afford the roads no elasticity to help meet the new conditions of low traffic and high wages. The earnings for the last four months were needed to offset the deficits of the earlier eight months for which they had not yet collected the guaranty and also, as it soon became apparent, the new deficits that they were to face in January and February, 1921.

The drop in the level of general business and in the wholesale prices of commodities came so rapidly that the high level of railroad rates stood out as a prominent target for those in search of a quick remedy for the general situation. The government having regulated freight rates for many years, but not having made much progress in other directions in repealing the fundamental laws of supply and demand, and other economic laws, it was exceedingly natural for many people to attribute the effect of the business depression, which they did not know how to relieve in any other way, to the cause of high freight rates which they could ask the government to reduce for them. It having become the custom to regulate rates more in accordance with the needs or wishes of the shippers than of the railroads, a demand for a reduction proportionate to the change in the condition of other industries seemed only natural and Congress and the commission began to be flooded with demands for action to reduce rates in order to revive business.

For a time the commission under the leadership of Chairman Clark stood firm against this onslaught and Mr. Clark wrote numerous letters to members of Congress and others pointing out that the railroads, far from having been guaranteed a specific return, were in most cases not even earning operating expenses and that the causes for the depression lay far deeper than rates.

Agitation for Repeal of Rate Law

The idea that the railroads had been guaranteed 6 per cent had been so sedulously spread, both by deliberate propaganda and by the careless statements of those who had not bothered to read the law, that a repeal of the rate-making provisions of the Transportation Act appeared to many as the easy solution of the difficulty, and it appealed with particular force to the average Congressman as the only way in which he could exert himself to comply with the demands of his constituents.

Because of the particularly rapid deflation of the prices of agricultural products, the idea of reducing rates by law was taken up by many members of what is now called the agricultural bloc and many bills were introduced, particularly in the Senate, to either repeal Section 15a of the law or to substitute a lower percentage of return, in spite of the fact that the railroads were not earning as much as even the minimum rate suggested.

The action of the Interstate Commerce Commission in ordering increases in intrastate rates where the state authorities had refused to do so also added to the resentment in many quarters and the strength of the advocates of so-called "state rights" was added to that of those who merely desired lower rates.

Attempts of Railroads to Reduce Labor Cost

Meanwhile the railroads were being driven to the most drastic economies merely to meet their current running expenses, to say nothing of lowering rates. Acquiescing in the award of the Railroad Labor Board increasing wages in 1920, they had first turned their attention to the abrogation of the standard rules and working conditions—imposed by the national agreements entered into by the Railroad Administration shortly before it relinquished the railroads—before giving any consideration to the question of wage reductions.

The Labor Board was proceeding in a somewhat leisurely fashion to hear the voluminous evidence in this case when General Atterbury of the Pennsylvania, on behalf of the labor committee of the Association of Railway Executives, appeared before the board on January 31 and asked that the national agreements, which he estimated were costing the roads $300,000,000 a year in increased expenses, be abrogated at once to save the roads from bankruptcy. He also asked that the board make a reduction in the wages of unskilled labor, promising that if these requests were complied with, his committee would recommend to the roads that they withhold for at least 90 days any action looking to a reduction in basic wages. The board declined to grant the request, and the railroads thereupon began to take the necessary steps toward a wage reduction.

Partial Payment of Guaranty Provided For

The roads had also taken up with Congress and secured an amendment to the Transportation Act to provide for partial payments on account of their six months guaranty which the comptroller of the treasury had held could not be made beyond the advances specifically provided for on applications filed prior to September 1, 1920, until the commission was in a position to certify the final adjustment of the total amounts due in each case. Congress was willing to extend this assistance to the railroads because it had been generally understood that the law as originally passed provided for partial payments.

Labor Charges Managements With Extravagance

The passage of the bill, however, brought out a good deal of discussion of the railroad rate situation and also of charges made by the railroad labor organizations that the railroads had been extravagant at government expense during the six-months guaranty period of 1920. The charges were based particularly on the contracts made by certain railroads for car and locomotive repairs in outside shops for which they paid some high prices to get the work done quickly, although the law specifically limited the amount of maintenance expenditures for which they should be guaranteed. The Interstate Commerce Commission in January ordered a general investigation of these charges and held several hearings upon them besides securing a mass of information on the subject through questionnaires and the work of its examiners. No report, however, has yet been issued.

President Harding Tries to Bring About Rate Reductions

President Harding had joined in the demand for rate reductions in his address to Congress on April 12, in which he said that "railway rates and the cost of operation must be reduced," although he did not recommend any additional legislation to accomplish that result and he did not fall into the error of condemning the rates without recognition of the cause. While he said that "freight-carrying charges have mounted higher and higher until commerce is halted and production discouraged," and that no improvement in the general business situation can be permanent "until the railways are operated efficiently at a cost within that which the traffic will bear," he also referred to the situation in a way

to indicate that the low tide of business was a cause rather than entirely the effect of the difficult transportation situation.

Following this the President held a conference with Chairman Clark of the Interstate Commerce Commission and Chairman Barton of the Labor Board, after which he called in one at a time various representatives of the railroads, the labor organizations, the shippers and the security owners' association for the purpose of informing himself. It became evident after these conferences that the President had been brought to a realization that it would require more time to straighten things out than he had perhaps at first appreciated and that the railroads could do little to assist business generally through the period of readjustment without some assistance for themselves.

General Public Misunderstanding

The railroads have been confronted throughout the year not only by the practical problem of reducing their expenses, but also by an important psychological problem which made the practical one even more difficult. The American people, having been led to believe that private management of the railroads would be more economical than government management, had reached the conclusion that results in this direction should be shown at once. When it appeared, therefore, that the operating expenses of the railroads for the year 1920 were some $1,400,000,000 greater than they were in 1919, the situation called for an explanation that was difficult to make to those who were not sufficiently and directly interested in the problem to keep the figures in their heads. They had had their attention called to a wage advance of $600,000,000 to $700,000,000 in 1920 but not to the total of the various wage advances made in the latter part of 1919, which had their effect in 1920, and hardly at all to the effect of the national agreements made by the Railroad Administration in the latter part of 1919 and the early part of 1920, which the railroads estimated added $300,000,000 a year to their cost of operation. Moreover, the effect on expenses of the handling of a greater volume of traffic in 1920 than had ever been known was not generally appreciated except among those whose direct business it was to notice it.

When added to all this was the fact that the railroads had been guaranteed for the first six months after the end of federal control—although a highly technical provision of the law carefully restricted this guaranty so as not to protect the railroads on any increase in maintenance—and the popular belief that the 6 per cent rate-making rule constituted a real guaranty, only a little demagoguery and a little propaganda were necessary to create a state of public opinion which caused a most difficult position for the railroads.

Neither the demagoguery nor the propaganda, however, were confined to "a little" and aside from the selfish propaganda, high authorities in the government were obtaining wide publicity for their opinions that rates were too high and must be reduced. Close and continued attention to the public utterances made on these subjects by President Harding and Secretary Hoover leaves no reason to believe that they ever had any particular idea of insisting upon large rate reductions until the foundation could first be laid by a reduction of operating costs, although at first they were apparently impressed with the popular idea that high rates were defeating their purpose and lower ones might produce more revenue, but any qualifications with which they expressed their opinions were not always emphasized and were soon lost sight of. Thus some very influential voices were raised to swell the volume of protest and as these gentlemen progressed in their understanding of the situation they were not always able to bring about a corresponding transition in the minds of the newspaper men who interpreted their views to the public.

President Harding discussed his views of the rate question on many occasions with the Washington correspondents but, as the President is not quoted, the main idea of his remarks, to the effect that rates must come down, was the feature that was made public. Even after he had personally visited the Interstate Commerce Commission and had caused a statement to be issued from the White House that he was surprised and gratified at the progress being made in the way of readjustment and voluntary reductions in rates, and after he had stated that he was not in favor of a general percentage reduction, the effect of the development of his ideas failed to "get across." This is not to deny the fact that the influence of both President Harding and Secretary Hoover has been on the side of a rate reduction, but it is also true that for several months they have also recognized that no extensive reduction in rates was practicable until there had been more of a reduction in the cost of performing the service and that the efforts of the roads to lower wages have had their moral support.

Senate Orders General Railroad Inquiry

The demand for lower rates and the charges against the railroads led to the introduction by Senator Cummins and the passage by the Senate on April 12 of a resolution authorizing the Interstate Commerce committee to conduct a general investigation of the railroad situation, to inquire among other things into "the reasons which led to the extraordinary cost of maintenance and operation from March 1, 1920, to March 1, 1921, the reasons which induced the diminished volume of traffic including the influence of the increased rates, the efficiency or inefficiency of railroad management and of labor," and "the best means of bringing about a condition that will warrant the Interstate Commerce Commission in reducing freight and passenger rates."

Before introducing the resolution Senator Cummins had made some investigation of his own and it is believed that one of the purposes was to head off some of the various amendments to the Transportation Act that were being proposed.

The Senate committee began its hearings on May 10 and the railway executives and their statisticians put before it a comprehensive explanation of the condition of the carriers, showing that it was an inheritance from the period of federal control which they must overcome before they could again demonstrate the economy of private management as compared with governmental operation. They were also able to show conclusively that the general business depression had numerous perfectly good causes entirely independent of freight rates.

Following the railroad testimony, witnesses were heard on behalf of the National Association of Owners of Railroad Securities, who were somewhat critical of the railroad managements but at least sustained their statements as to the principal elements in the situation. At any rate the railroads succeeded in making at least a prima facie case before the committee to demonstrate the main causes for the increase in expenses without leaving much room for faith in the charges of deliberate extravagance that had been made against them, and sufficient also to demonstrate to almost anyone who was willing to give attention to the subject that the Transportation Act was not at the root of the difficulty.

Comparatively few representatives of the shippers had asked to be heard by the committee and while the labor organizations had asked to be heard, they had postponed the date for their appearance so when hot weather came and Chairman Cummins' health demanded a rest, the hearings were adjourned and not resumed until fall.

The railroads had at least succeeded in convincing the committee that no change in the rate-making provisions in the law could help the rate situation and that little could be done by anyone pending a determination of the wage

question then before the Labor Board. The committee apparently came to the conclusion that there was practically nothing that Congress could do to remedy the situation of which the public was complaining. About the time the hearings were adjourned, the Labor Board made its 12 per cent reduction in wages and traffic was beginning to pick up and the adjournment gave an opportunity for time to demonstrate the results. Moreover, the railroads had shown that some very considerable rate reductions were being made by way of readjustment.

Efforts to Expedite Settlements With Railroad Administration

One result of the Senate committee hearings, however, was to bring to the attention of Senator Cummins and other leading members of the committee the difficult position the railroads were in with relation to their accounts with the Railroad Administration. President Rea of the Pennsylvania stressed this point particularly, saying that the greatest immediate relief that could be given the roads was some way of expediting the payment of the large sums still owing to the roads for the period of federal control, and also the balance still due for the six months guaranty period. He showed that while the Railroad Administration owed the roads several hundred million dollars, it was attempting to offset against it the amounts due from the railroads to the government for capital improvements which the roads should finance by long term securities, and, moreover, that the payment of the sums due the roads was delayed by the complicated nature of the settlements and the undecided controversy over the basis of the maintenance claims.

While the committee itself took no action, Senator Cummins bestirred himself and assisted the roads in enlisting the interest of the President. Many conferences were held, which took in the director general of railroads, the Interstate Commerce Commission, Secretaries Hoover and Mellon, and the managing director of the War Finance Corporation. The result was that the administration took up the matter as a plan for improving general business conditions by assisting the railroads to obtain the cash with which to pay outstanding bills and undertake maintenance work which would put money into circulation and give employment to many men.

As a condition, however, to the funding of the railroad indebtedness, it was insisted that the railroads agree to waive their claims for reimbursement for undermaintenance based on the so-called "inefficiency of labor" factor, as far as settlements with the Railroad Administration were concerned, although they were to retain their right to go to the courts. When they had done this, thus relieving the government of a contingent liability estimated as high as $800,000,000 which no one could be sure the courts would not allow, the President in July urged upon Congress the passage of a bill to authorize the War Finance Corporation to purchase railroad securities taken by the United States Railroad Administration in payment for the additions and betterments, thereby giving the Railroad Administration funds with which to pay its indebtedness to the railroads without an appropriation.

The President under the Transportation Act had the power to fund the capital expenditures but the Railroad Administration did not have funds sufficient to pay the roads what it would owe them without offsetting the capital expenditures. The purpose of the bill was to enable the government to convert into cash the obligations it had taken from the railroads, and would take in connection with the funding, by transferring the indebtedness of the railroads from the government to the investing public, but it was considered necessary at that time to have the War Finance Corporation carry some of the securities temporarily until market conditions improved so that it could sell them at par.

The bill was passed by the House in August, although with a provision that would bar any road, even one that declined to settle with the Railroad Administration, from pursuing a claim for inefficiency of labor in the courts, but it struck a snag in the Senate in the agricultural bloc that was unwilling to do anything for the railroads without first obtaining a reduction in rates. Careless newspaper reporting, muddle-headed demagoguery and deliberate propaganda largely instigated by the labor organizations soon created a general impression that the sole plan was to give or at least loan the railroads $500,000,000 of new money and when the Senate committee finally reported the Winslow bill in a modified form it was promptly assailed with so many amendments designed to emasculate the Transportation Act that the efforts of its supporters to pass the bill were relaxed before the close of the extra session.

Meanwhile the War Finance Corporation in September, acting unofficially for the director general of railroads, made an offering of some of the car trust certificates which it had taken from the railroads in payment for the cars and locomotives bought during federal control and found it possible to sell some of the best of them at par and accrued interest. More sales were then made, which gave the Railroad Administration additional funds with which to make settlements with the railroads without the need of an additional appropriation and considerable progress has been made in settling with the roads that were either so needy as to desire a quick settlement without funding or could afford to allow their indebtedness on capital account to be subtracted from the sums due them on open account. When the regular session of Congress began on December 5 no efforts were made to push the passage of the bill.

Bills to Amend Transportation Act

All through the year various bills were introduced in Congress to repeal the provisions of the Transportation Act which direct the commission to try to make rates that would produce as nearly as may be an annual return of 5½ or 6 per cent and those under which the Interstate Commerce Commission had ordered increases in intrastate rates in those states which refused to increase rates by the amount which the commission had found necessary in its decision in Ex Parte 74 to enable the roads to earn the fair return prescribed by the act. Some of these bills were so drawn as to nullify every order ever issued by the Interstate Commerce Commission to correct state discrimination against interstate commerce, including those that had been sustained by the Supreme Court under the old law. These bills reposed quietly in committee during most of the session and while the Senate committee was conducting its general investigation, but after some of the western Congressmen had gone back home during the summer the pressure was renewed and the Senate committee on October 24 began a series of hearings on the Capper and Nicholson bills instead of resuming the general investigation.

For about two weeks the committee listened to the testimony of state railroad commissioners and such representatives of the shippers as Clifford Thorne and S. H. Cowan, who gave such a warped and biassed view of what the commission had done to the rates that the committee seemed to be about to report a bill. An effort was made to hurry up the testimony on behalf of the railroads but they insisted on their right to present their case and with the assistance of several witnesses representing the National Association of Owners of Railroad Securities, including E. E. Clark, apparently soon succeeded in counteracting much of the effect of the previous testimony. Walker D. Hines, formerly director general of railroads, also appeared before the committee and made a strong defense of the various provisions of the Transportation Act, as did representatives of the Railway Business Association and the Chamber of Commerce of the United States.

Attitude of the I. C. C.

The demand for reduced rates was met by the Interstate Commerce Commission during the early part of the year by having its traffic bureau arrange various informal conferences between representatives of the railroads and the shippers for the purpose of seeing whether reductions could be agreed upon. In many cases where it was shown that a peculiar hardship was being caused by the rates, or that lower rates would make possible the movement of certain classes of traffic, these conferences resulted in reductions, but in several important cases the roads felt unable to grant the requests.

There was a general readjustment of grain rates made necessary in the first instance to restore relationships disrupted by the percentage advance, but before it was completed competition with the Canadian roads and between the roads serving Atlantic and Gulf ports led to some very extensive reductions, particularly in export rates. Before the end of the year it was estimated that reductions amounting to $200,000,000 a year had been made.

The first formal case heard by the commission involving a request for extensive reductions in rates was the western live stock case, in which the commission did not issue an order. It did, however, issue a report on August 15 recommending a reduction to 80 per cent of the rates in effect in western territory which were higher than 50 cents as justified not by transportation conditions but by the economic condition of the industry. The railroads complied with this recommendation.

Then the commission, acting on petitions filed by the western state commissions and the American Farm Bureau Federation ordered an investigation of the rates on grain, hay and grain products in the western districts and after an expedited hearing issued a report saying it expected the roads to make reductions but did not issue an order until the railroads had failed to observe its recommendations.

The Threatened Strike

The question of rate reductions has been complicated by its dependence upon the wage question. During the early part of the year the roads were asking that wages be reduced and the rules of the national agreement be modified in order to save them from bankruptcy, as for several months a large proportion of the roads were not earning operating expenses. During this time many of the shippers were refraining from pressing for rate reductions, realizing that the high rates were largely due to the wage increases that had been made.

The National Industrial Traffic League went on record as deprecating the agitation for general rate reductions and it tried to intervene in the rate case with evidence on behalf of the shipping public but was denied a hearing by the board. As the condition of the railroads gradually improved, as a result of their drastic curtailment of maintenance and other expenses, including the laying off of several hundred thousand employees, and as a result of the gradual increase in traffic, the agitation for rate decreases became stronger, particularly after the Labor Board had made a reduction in wages estimated at $300,000,000 to $400,000,000 a year. The roads showed, however, that this was not sufficient to justify general rate reductions, and even when their net income began to approach the statutory rate of return, reaching 5 per cent in August, they pointed out that this had been done largely at the expense of maintenance and that it was necessary to make up for the deficits of the early part of the year to be able to pay fixed charges for the year.

Some of the more conservative elements among the shippers began to complain that the railroads were hiding behind the Labor Board and there was more or less agitation for the abolition of the board or its co-ordination with the Interstate Commerce Commission. After the decision of the commission in the western livestock case, in which it became evident that the commission was not inclined to wait too long for a further reduction in wages, and after some correspondence with Chairman McChord of the Interstate Commerce Commission, who had urged the roads to make some voluntary reductions in rates, the Association of Railway Executives tried to adopt a general rate policy and its executive committee went to Washington where it held conferences with President Harding, Mr. McChord, Secretary Hoover and Chairmen Cummins and Winslow of the two Congressional committees on interstate commerce. All of these men told the railroad executives that they considered it highly important from a policy standpoint that the roads make some voluntary reductions.

The committee went to a general meeting of the member roads of the association at Chicago on October 14 with a recommendation that the roads make an immediate reduction of 10 per cent in the rates on agricultural products and then take steps to ask for another wage reduction with the understanding that it should be translated at once into rate reductions. At the meeting, however, a number of the roads, particularly those in the West, declared that they could not afford to make the 10 per cent cut proposed and only the latter part of the plan was adopted.

On the same day a committee representing the railroad brotherhoods asked for a conference to present a demand that the 12 per cent wage cut of July 1 be rescinded and that the roads make no further reductions for a year. This demand was backed up by a strike vote and when the roads met it by handing the brotherhood committee a copy of the resolutions adopted proposing a new wage cut, the strike orders were issued. The strike vote had been taken in protest against the wage reduction ordered by the board effective July 1, but it was commonly accepted as being intended merely to head off a new move in the direction of further reductions. The railroads had called the bluff, however, and the labor organizations were thus placed in the position of threatening to strike against the order of an impartial public tribunal.

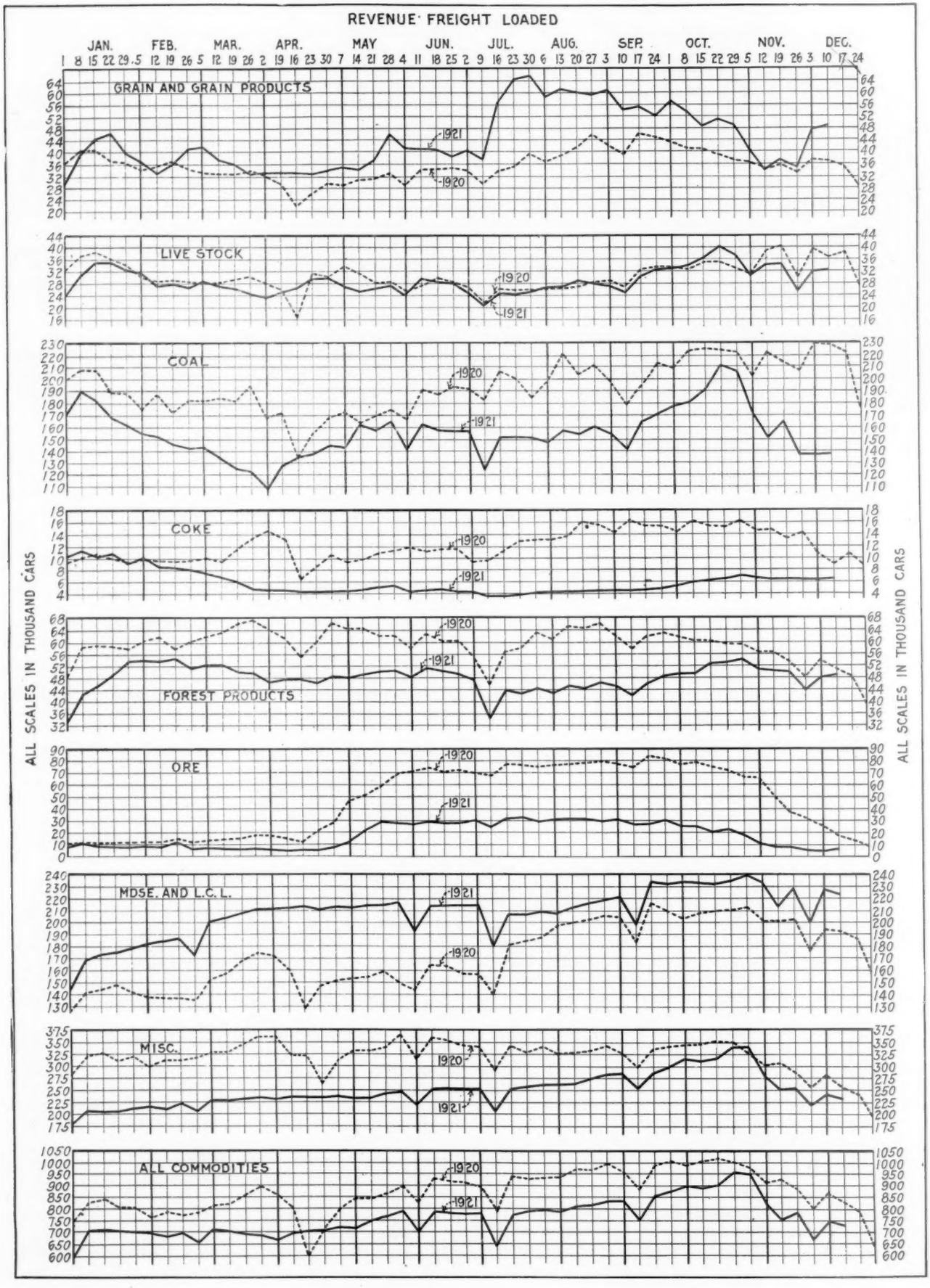
When it was made clear that such a strike would have no support in public sentiment and that the government was proposing to put some teeth in the labor provisions of the law by seeking injunctions against a violation of the Labor Board's orders, the brotherhoods were given an opportunity to call off the strike without too much appearance of surrender by an announcement of the Labor Board that it could not take up a new wage case for any class of employees until it had cleared its docket of cases involving rules and working conditions for that class.

The settlement of the strike was made without any promises or concessions of any kind from the railroads. They had made it clear that they were proposing wage reductions as the only way of complying with the public demand for rate reductions and they began to proceed at once with the steps necessary to get a wage dispute before the Labor Board with a view to showing that if there was any delay the responsibility for it was not theirs.

This required the service of notice of a proposed reduction upon the employees of various classes and an effort to reach an agreement with them before application could be made to the board.

Meanwhile the Interstate Commerce Commission issued its report in the western grain case directing the roads to make on or before November 20 reductions by one-half of the 35 per cent and 25 per cent increases made in the Western and Mountain Pacific districts. The commission made no order, however, but said that one would be issued if necessary. In this decision the commission made little attempt to show that the reductions were justified from a transportation standpoint. The reduction was based on the economic condition of the agricultural industry and reconciled with Section 15a

(*Continued on page 26*)


REVENUE FREIGHT LOADED
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC.
GRAIN AND GRAIN PRODUCTS
LIVE STOCK
COAL
COKE
FOREST PRODUCTS
ORE
MDSE. AND L.C.L.
MISC.
ALL COMMODITIES
1921
1920
ALL SCALES IN THOUSAND CARS
ALL SCALES IN THOUSAND CARS

Illinois Central Yard on Lake Front, Chicago—Photo by Underwood & Underwood

Five Years of Freight Traffic Growth Is Lost

Railways in 1921 Carry Less Freight Than in Any Year Since 1915 —Passenger Traffic Exceeds 1916

By Harold F. Lane

WASHINGTON, D. C.

THE VOLUME of railroad freight and passenger traffic throughout 1921, with the important exception of grain, has naturally reflected the general business depression; the effect of the decreased traffic has also shown itself in many of the statistics which are commonly used to measure railway performance.

So far as freight traffic is concerned the railroads in 1921 lost five years of growth, the volume of freight business for the year having fallen below that for 1920, 1919, 1918, 1917 and 1916. In the case of passenger traffic 1921 was somewhat ahead of 1916. While the ton-mile statistics are available only for the ten months ending with October—except as it is possible to make estimates for November based on incomplete returns—a current index of the amount of freight business handled by the railroads is afforded by the weekly report compiled by the Car Service Division of the American Railway Association showing the number of cars loaded with revenue freight during the week subdivided into groups of the principal commodities. These reports are available in about 10 or 12 days from the close of the week, whereas ton-mile figures are not available for some weeks after the close of the month. Moreover, the weekly reports show fluctuations which are not shown in the monthly reports and the car loading figures give the division by commodities which is not otherwise available except in quarterly reports.

The car loading figures are, however, less exact than the tonnage and ton-mile statistics because the average carload is subject to variations; during 1921 it has averaged between one and two tons less than in 1920. Measured by the number of cars loaded, freight traffic in 1921 has been only about 13 per cent less than in 1920, the record year. However, the ton-miles for the first ten months of the year show a decrease of 23 per cent as compared with 1920. Passenger traffic shows a reduction of about 20 per cent.

RAILROAD FREIGHT TRAFFIC fell about 23 per cent below that of the record year 1920; and was less than for any year since 1915.

Passenger traffic less than for any year since 1916; about 20 per cent less than in 1920.

Effect of reduced traffic is shown in reduced miles per car per day, car load and train load.

Car surplus existed throughout year, reaching record-breaking figure of 507,000 cars on April 8.

Car Loading and Ton-Mile Statistics

Up to December 17 the number of cars loaded with revenue freight was 38,716,335, as compared with 44,613,-864 for the corresponding period of 1920. The total for the year, therefore, may be estimated at approximately 40,000,000 as compared with 45,237,941 in 1920, 42,180,328 in 1919 and 44,655,041 in 1918. The car loading figures for the railroads as a whole were not compiled before 1918. The net ton-miles, which are shown in the accompanying charts and tables compiled by the Bureau of Railway Economics, show a greater decrease as compared with 1920 than is shown by the car loading figures. For the ten months, January to October, inclusive, the total net ton-miles for the current year were 289,634,000,000, as compared with 376,760,000,000 in the corresponding ten months of 1920, a decrease of 23 per cent. The reduction in traffic has been greater than that indicated by the car loading due to the fact that for varying reasons the average car load was less in 1921 than in 1920.

The revenue ton-miles and passenger miles by months for recent years have been as given in the following table:

The car loading by months, by the principal groups of commodities, is shown in the second table compiled by the Car Service Division:

Trend of Freight Traffic

On the chart showing the trend of the ton-mile figures the line for 1921 has been below that for each of the last five years throughout the year, and it crossed the 1916 line only at two points, representing May and October. The car-loading chart shows, however, the 1921 line above that for 1919 at several points and during the week of October 22 it approached very closely to the 1920 line.

Traffic was considerably stimulated during October by the anticipation of a possible railroad strike which led to some stocking up, particularly of coal. The peak car loading for the year was in the week of October 22, when the total was 962,292 cars, or about 5 per cent less than the 1920 peak of 1,011,666 cars. Since that time there has been a rapid decrease. Coal production per week, which heretofore has reached as high as 12,000,000 and 13,000,000 tons in the latter part of the year fell back to a little over 7,000,000 tons, which is about the average for April. For the week ending December 17 the total car loading had fallen to 727,332, which was 75,268 less than for the corresponding week of 1920 and 79,731 cars less than for 1919.

The deeper "valleys" shown in the car loading chart generally represent weeks which include holidays, although the one for April 16, 1920, indicates the low point of loading at the time of the switchmen's strike and the August 13, 1919, depression represents the loss of loading at the time of the shop crafts strike. The sharp falling off in the latter part of 1919 also represents to some extent the coal strike

NET TON-MILES—BY MONTHS

CLASS I RAILWAYS—UNITED STATES

Month	1916	1917	1918	1919	1920	1921
January	*	32,652,616,000	27,619,867,000	30,352,685,000	34,764,807,000	29,824,391,000
February	*	28,386,351,000	29,678,260,000	25,625,783,000	32,695,352,000	24,913,294,000
March	*	31,674,619,000	37,706,100,000	29,122,675,000	37,991,269,000	26,825,588,000
April	30,463,818,000	34,279,893,000	37,992,810,000	28,799,160,000	28,530,657,000	25,578,883,000
May	27,693,982,000	38,552,223,000	37,506,935,000	32,567,778,000	37,902,007,000	28,218,768,000
June	28,787,016,000	38,477,863,000	37,667,517,000	32,271,423,000	38,157,869,000	28,140,661,000
July	30,409,037,000	37,137,163,000	39,347,137,000	35,214,224,000	40,450,094,000	28,412,404,000
August	34,231,761,000	36,044,333,000	40,776,125,000	36,525,943,000	42,706,838,000	30,381,958,000
September	33,131,238,000	35,469,005,000	39,579,023,000	39,015,351,000	40,999,843,000	30,821,944,000
October	36,164,923,000	38,224,083,000	39,842,297,000	40,549,232,000	42,562,687,000	36,506,565,000
November	34,929,276,000	36,404,612,000	35,564,236,000	32,750,629,000	37,458,630,000	.....
December	32,680,284,000	31,960,171,000	33,639,389,000	33,608,668,000	34,722,365,000	.....

REVENUE PASSENGER-MILES—BY MONTHS

CLASS I RAILWAYS—UNITED STATES

Month	1917	1918	1919	1920	1921
January	*	3,101,995,000	3,479,000,000	3,501,000,000	3,358,000,000
February	*	2,905,442,000	3,169,000,000	3,174,000,000	2,857,000,000
March	*	3,378,231,000	3,443,856,000	3,529,902,000	3,056,000,000
April	*	3,371,015,000	3,466,195,000	3,551,811,000	2,832,811,000
May	*	3,691,058,000	3,649,431,000	3,760,702,000	2,969,406,000
June	*	3,924,525,000	4,150,526,000	4,149,434,000	3,214,896,000
July	*	4,037,083,000	4,528,608,000	4,785,323,000	3,637,499,000
August	*	4,375,695,000	4,771,981,000	4,988,019,000	3,622,959,000
September	*	3,965,260,000	4,318,446,000	4,294,118,000	3,291,452,000
October	*	3,201,092,000	3,872,391,000	3,761,875,000	.....
November	*	3,068,533,000	3,540,294,000	3,518,107,000	.....
December	3,752,798,000	3,620,183,000	3,802,165,000	3,640,548,000	.....

*Not available by months.

COMMODITY LOADING BY CALENDAR MONTHS, 1921-1920-1919

	Grain and grain products			Live stock			Coal			Coke			Forest products		
	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919
Jan.	177,222	161,156	176,992	139,455	151,684	172,498	741,153	824,597	804,867	34,068	42,859	Inc. in coal	200,070	244,439	225,351
Feb.	147,874	141,425	126,325	113,007	116,602	133,548	594,287	720,163	570,496	35,826	39,825	Inc. in coal	213,314	240,372	226,658
March	164,077	148,531	160,724	117,880	129,890	129,992	576,753	827,078	623,592	28,167	53,491	Inc. in coal	226,854	291,387	250,527
April	145,041	118,063	163,235	119,240	114,314	127,492	583,716	688,129	632,140	20,076	44,876	Inc. in coal	206,615	265,316	233,449
May	161,133	130,041	140,460	111,416	127,266	121,611	658,022	713,029	682,080	21,622	44,801	Inc. in coal	207,598	264,882	231,253
June	181,081	149,534	136,947	121,752	124,800	122,278	696,313	838,934	778,707	21,065	51,300	Inc. in coal	221,570	268,005	271,205
July	239,856	150,440	199,551	104,223	109,734	127,580	634,099	843,280	840,520	17,056	51,275	Inc. in coal	182,077	242,681	262,052
Aug.	269,877	184,822	211,665	124,398	122,862	130,832	699,192	936,018	790,192	19,874	66,750	44,026	202,546	289,230	272,304
Sept.	239,518	187,691	204,189	129,596	135,762	152,660	705,830	865,696	877,871	21,408	67,463	46,066	201,248	266,594	274,381
Oct.	204,976	172,470	184,213	148,266	146,486	177,314	792,609	968,623	962,533	26,184	69,127	42,468	209,965	259,859	257,872
Nov.	164,652	151,808	173,705	136,589	151,204	175,821	669,235	934,625	500,724	28,034	62,970	46,895	211,662	231,827	248,016
Dec.	.....	156,309	170,962	.....	126,634	161,226	.....	954,567	766,161	.....	58,589	46,062	.....	207,750	235,739
Total	.....	1,852,290	2,048,968	.....	1,557,238	1,732,852	.....	20,114,739	3,829,883	.....	653,326	225,517	.....	3,072,342	2,988,807

COMMODITY LOADING BY CALENDAR MONTHS, 1921-1920-1919

	Ore			Merchandise L.C.L.			Miscellaneous			Total		
	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919
Jan.	37,408	45,479	64,977	584,010	601,731	Inc. in misc.	1,022,132	1,334,563	1,822,789	2,935,518	3,406,508	3,267,474
Feb.	35,295	51,492	65,116	730,996	552,209	Inc. in misc.	864,401	1,250,693	1,625,220	2,735,000	3,112,781	2,747,363
March	29,160	71,222	66,162	933,563	743,542	Inc. in misc.	1,043,669	1,553,108	1,889,731	3,120,123	3,818,249	3,120,728
April	24,980	83,639	94,612	922,059	645,427	Inc. in misc.	1,024,626	1,248,497	1,853,456	3,046,353	3,208,261	3,104,384
May	100,396	241,260	187,866	901,845	650,064	Inc. in misc.	1,006,632	1,441,010	1,796,439	3,168,664	3,612,353	3,159,709
June	130,839	324,997	289,614	947,161	709,517	Inc. in misc.	1,106,764	1,549,670	2,010,268	3,426,545	4,016,757	3,609,019
July	131,665	324,351	320,377	879,383	749,824	Inc. in misc.	1,072,777	1,429,446	2,142,365	3,261,136	3,901,031	*3,918,631
Aug.	142,960	351,921	191,738	968,747	911,741	588,195	1,227,599	1,493,882	1,631,110	3,655,193	4,357,226	*3,870,838
Sept.	123,727	347,575	288,465	971,527	885,597	625,634	1,248,530	1,434,034	1,709,921	3,641,384	4,190,412	4,179,187
Oct.	89,459	320,995	210,915	942,211	909,739	647,141	1,314,908	1,490,947	1,703,523	3,728,578	4,338,246	4,185,979
Nov.	33,930	188,118	116,124	953,899	849,667	644,546	1,030,706	1,254,521	1,586,097	3,278,707	3,824,740	3,491,922
Dec.	.....	67,766	53,943	.....	814,096	660,109	.....	1,065,666	1,430,892	.....	3,451,377	3,525,094
Total	.....	2,418,815	1,949,909	.....	9,023,154	3,165,619	.....	16,546,037	21,201,811	.....	45,237,941	*42,180,328

*Detail for Michigan Central not shown, 26,186 and 10,776 included in totals—36,962 included in total for year.

Figures compiled from weekly reports ending Saturday. Loading averaged for such days in weeks that occur in different months. Figures subsequent to November, 1920, subject to revision.

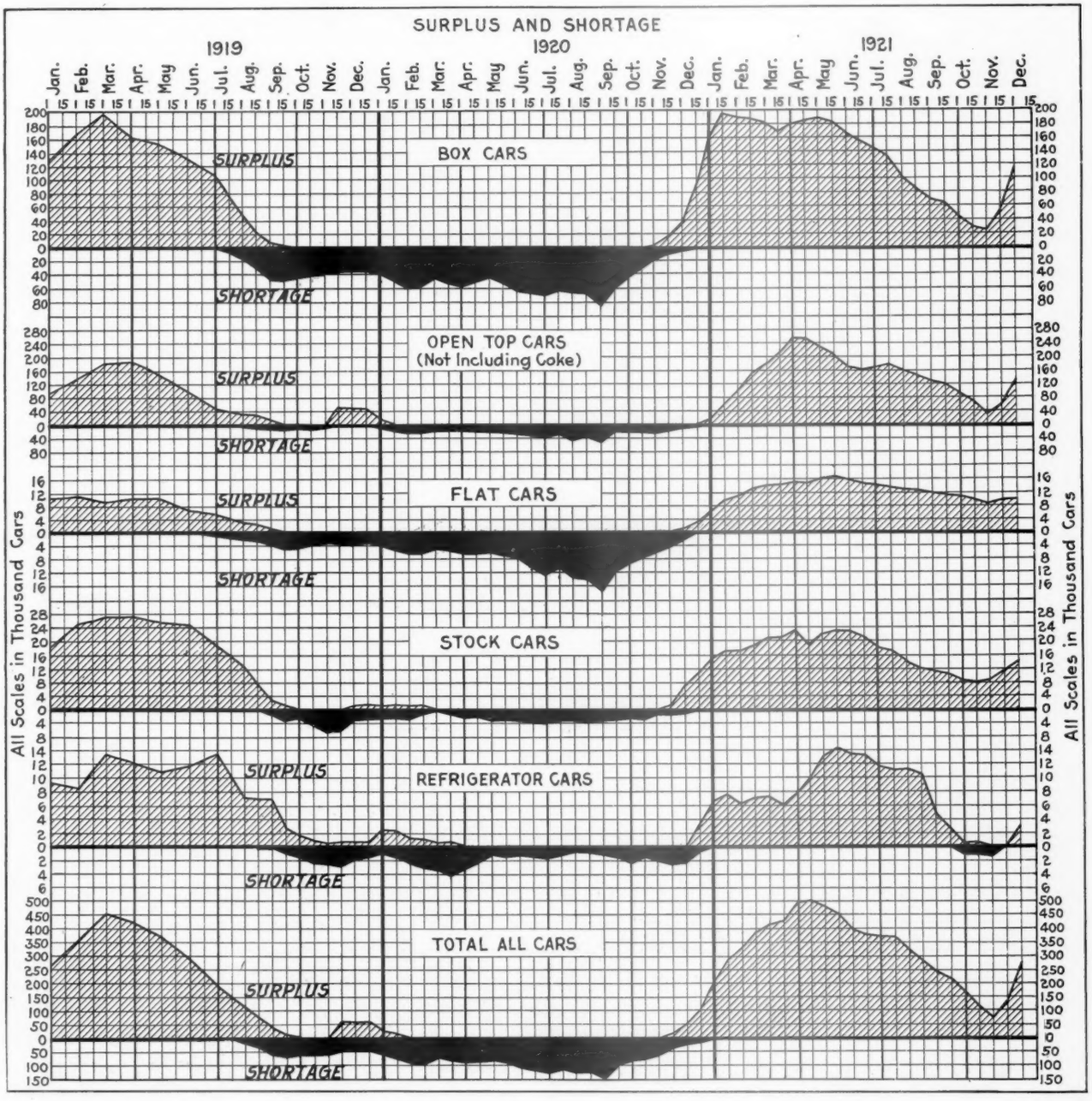
of that year, although the demand for transportation at that time was such that the shortage of coal tonnage gave an opportunity for an increased traffic of other kinds of freight.

The Car Service Division has recently been publishing a weekly information bulletin containing each week a number of charts and diagrams accompanied by text illustrating some phase of the transportation situation.

The series of charts showing the trend of the classified commodities in 1920 and 1921 displays, with the exception of the switchmen's strike period in April, 1920, a remarkable degree of uniformity in respect to the extent to which the total loading of all commodities in 1921 is below the figure for the same period of 1920. That uniformity of trend as to the total revenue freight loading does not obtain with respect to each classification, however.

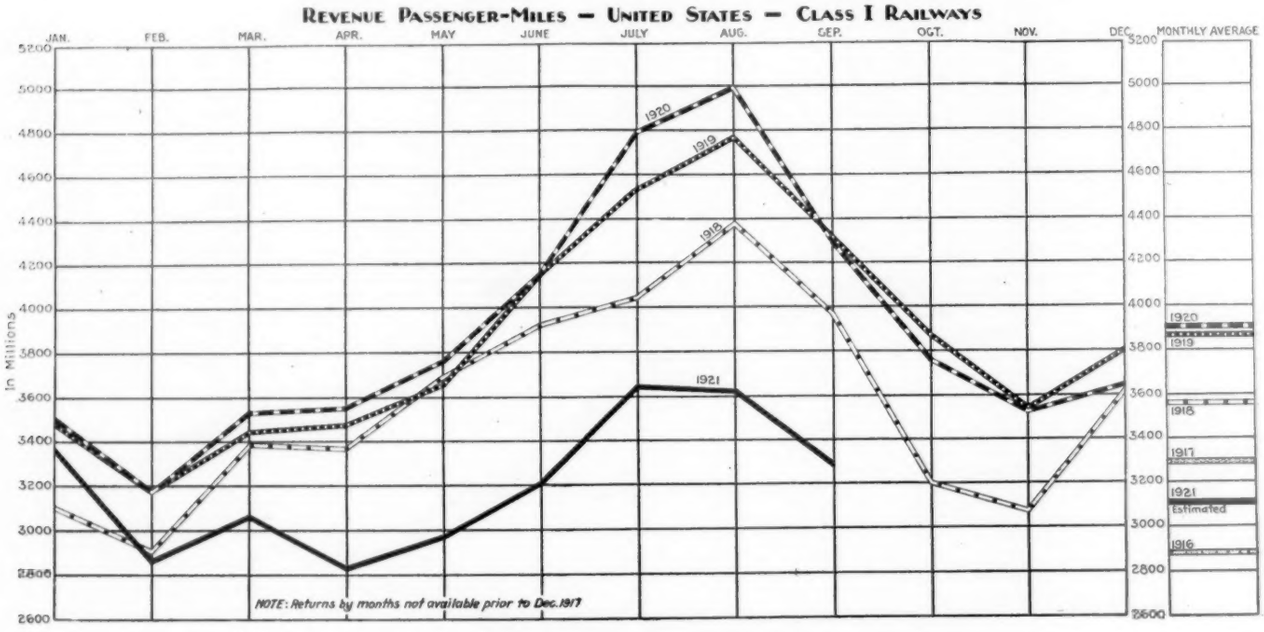
Concerning these charts, the outstanding features are the heavier grain loading in the present year, particularly since the harvesting of the new crop began in July, and the regularly heavier loading of l.c.l. merchandise. The former is generally attributed to the rapid marketing of this year's crop by the farmers, and the latter to the tendency in 1921 to do business in smaller units than in the previous year. The other outstanding feature of these charts is the marked decline in 1921 of the loading of coal, coke and ore, none of which have at any time approached the totals reached in the previous year. It will be noted that the grain loading has been above that for 1920 ever since the first of April and the loading for the year has broken previous records. The live stock movement follows closely that of 1920.

The maximum and minimum records of agricultural commodities reflect the usual seasonal variations. Extraordinary conditions have frequently contributed to these high and low records of other commodities. Thus, the records on coal loading reflect the periods of greatest demand in anticipation



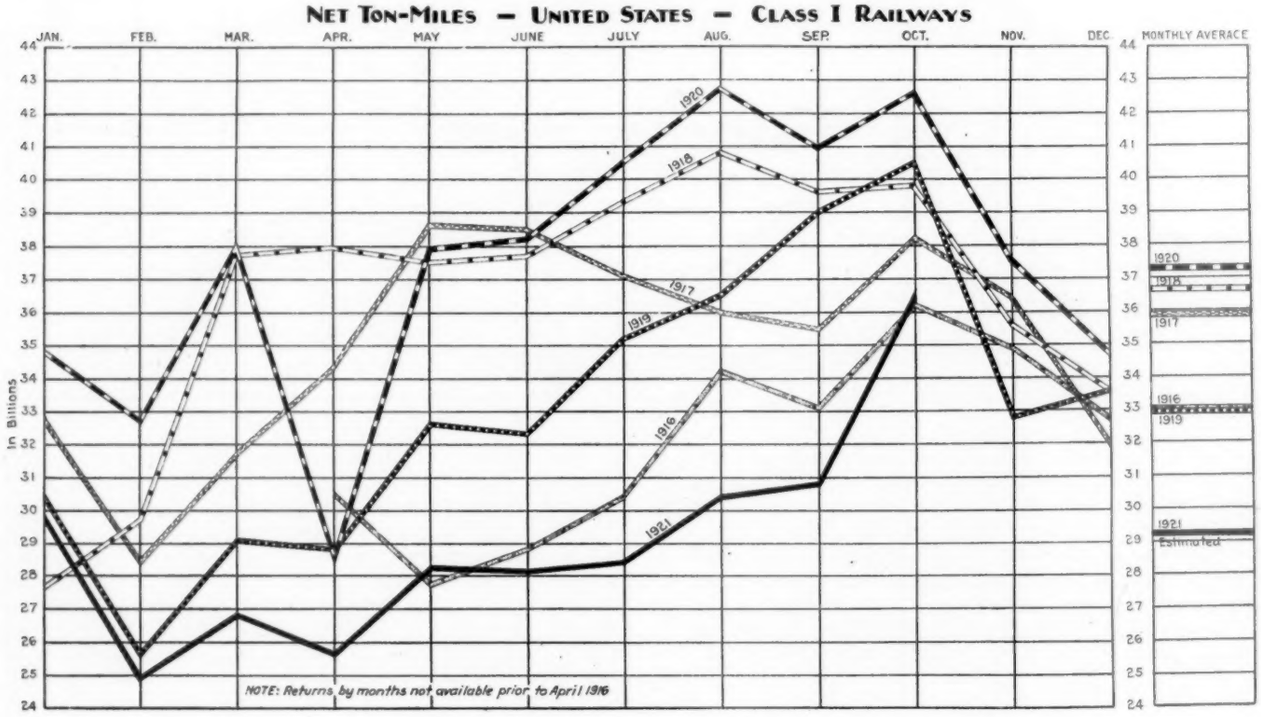
of, and greatest loss of production during, the bituminous coal miners' strike of November and December, 1919. The maximum records of coke and ore, basic commodities in iron and steel manufacture, were reached when the industrial boom of 1920 was about at its climax; the minima of these commodities is in the period of great depression in the iron and steel industry during 1921. The heaviest loading of forest products was early in 1920 before the dislocation of transportation which resulted from the switchmen's strike of that year; the low figure occurred at the very beginning of 1921 before the rehabilitation of the building industries had fairly begun.

The chart showing monthly production of anthracite and bituminous coal and of beehive coke for the calendar years 1915-1921 (ending November) inclusive, shows in a very emphatic way the comparative stabilization of production in the anthracite industry and the lack of stabilization of production in the bituminous industry. The marked valley in bituminous production usually reached in April, or thereabouts, reflects the gradual discontinuance of winter demand, the termination of the coal contract year on March 31, and the termination of the labor contract period on the same date with labor disturbances in consequence, at times.



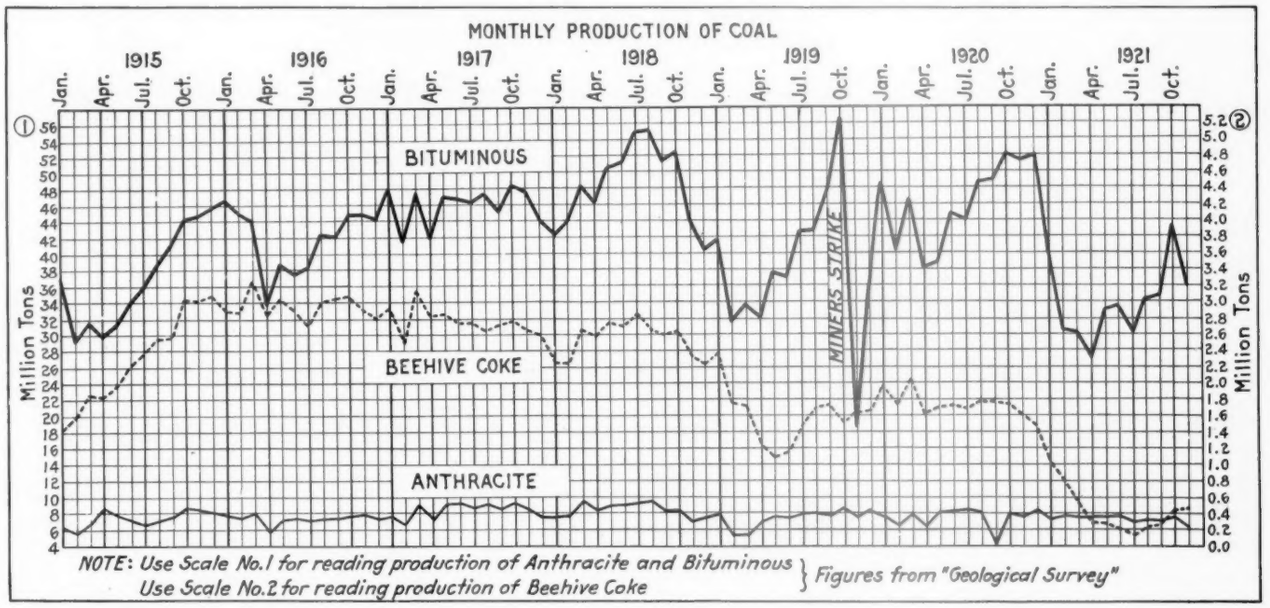
Coal Production

The marked depression in the bituminous production in late 1919 was the result of the bituminous miners' strike beginning November 1 that year, while the marked depres-



sion in anthracite production in August to October, 1920, was the result of the anthracite miners' strike during that period. The post-armistice depression of 1918-1919 accounts for the great falling off in bituminous production at that time and the existing industrial depression accounts for the low figure since December, 1920, which persisted throughout the year except when in October an increase resulted because of apprehension of labor disturbances on the railroads.

The outstanding feature of beehive coke production, as



shown on the chart, is the gradual decline from 1916. This is, of course, most marked in the two periods of depression already noted, but the general trend results from the gradual displacement of the beehive coke by by-product coke which began during the war period and is quite naturally more pronounced during periods of industrial depression.

The circular diagrams show at a glance the extent of participation by the railroads in each of the seven specified districts in the revenue freight business of 1921 as compared with 1920. In a general way these statements reflect the existence of conditions peculiar to the several districts. Thus, for instance, in the eastern district, merchandise, l.c.l., forms a very considerable portion of the total loading and the increase in the proportion of business handled in that district in 1921 results largely from this fact. In the Allegheny and Pocahontas districts the decline is accounted for by the depression in the coal and iron and steel trades, both of which have suffered considerably in the business depression of the current year, but the great loss of export coal trade is also a factor.

The relative increase of business in the southern district is accounted for by the fact that lumber loading in that territory has not suffered to as great an extent as in other districts, while contemporaneously certain of the non-union coal producing sections of the southern district have been working very regularly and in some weeks making record production, while in other districts coal loading has been very severely depressed. The figures for the three western districts reflect the increased grain loading since mid-summer 1921, but the beneficial effects thereof have been considerably overcome in the northwestern district by the great decline in ore loading. These diagrams cover the year to November 19.

Ratios of Operation

The effect of the light traffic during 1921 is reflected in the various ratios of operation as shown in the table com-

MONTHLY SUMMARY OF RATIOS OF OPERATION, UNITED STATES—JANUARY, 1917, TO OCTOBER, 1921

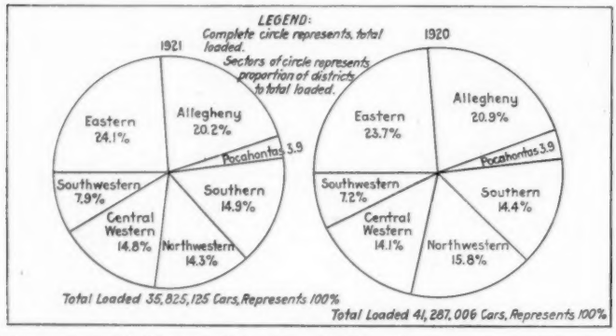
	Car-miles per day					Tons per car (revenue and non-revenue)					Percentage of unserviceable freight cars					Per cent loaded to total car-miles					Percentage of unserviceable locomotives		
Month	1917	1918	1919	1920	1921	1917	1918	1919	1920	1921	1917	1918	1919	1920	1921	1917	1918	1919	1920	1921	1919	1920*	1921
January	25.3	18.3	21.4	22.8	23.2	26.4	29.6	29.0	28.3	30.2	5.6	5.1	6.0	6.6	8.7	70.1	70.0	66.2	70.9	57.5	25.8	25.7	24.8
February	23.9	22.0	20.3	22.3	21.3	26.1	28.4	27.7	28.3	28.4	5.5	5.2	5.6	6.5	9.7	71.5	70.9	67.5	72.0	61.1	26.7	26.1	24.8
March	25.6	24.9	20.4	23.8	20.9	26.4	28.1	27.6	28.3	27.2	5.4	5.0	5.6	7.0	10.8	70.8	71.4	68.1	72.3	63.3	27.5	25.9	23.6
April	27.4	25.9	21.0	19.4	20.6	25.6	29.4	27.3	28.6	26.9	5.8	5.1	6.4	6.5	12.3	71.6	68.0	68.1	68.3	63.9	27.5	26.2	23.9
May	29.0	26.4	22.8	24.2	21.3	26.7	27.7	27.7	28.3	27.8	5.6	5.4	7.3	6.6	13.6	70.1	66.8	67.4	71.2	63.5	27.0	24.5	23.8
June	28.4	26.8	23.0	25.0	22.0	27.8	28.3	27.5	29.0	27.7	5.6	5.9	8.1	7.0	14.4	68.7	66.8	67.9	69.5	63.3	26.9	23.8	23.3
July	28.3	26.5	24.1	26.1	21.6	27.1	30.1	27.8	29.6	27.5	6.0	6.9	8.7	7.2	15.4	67.9	64.7	68.0	67.8	63.3	26.8	23.9	23.5
August	27.1	26.0	24.2	27.4	22.7	27.9	30.1	28.0	29.8	27.4	6.0	6.6	9.2	7.1	15.4	68.7	67.6	70.4	68.2	64.3	27.2	23.3	23.5
September	26.6	26.8	26.5	28.1	23.8	27.0	29.7	28.3	30.0	27.1	5.8	6.2	8.5	7.2	15.4	70.0	66.9	69.6	67.0	65.2	26.3	23.3	23.3
October	26.3	26.2	27.3	28.5	26.8	27.7	29.7	28.0	29.9	27.2	5.6	6.0	7.4	7.3	14.8	71.5	67.9	68.4	66.0	66.2	26.5	23.2	23.1
November	26.2	24.6	23.3	26.8	....	27.2	29.5	26.2	30.5	....	5.2	5.6	6.3	7.5	....	71.0	67.1	71.3	63.2	....	27.0	23.2	....
December	21.3	22.8	22.3	24.8	....	29.2	29.8	27.7	31.2	....	5.2	5.8	6.2	7 9	....	70.9	65.9	71.1	60.3	....	27.1	23.5	....
Total	26.1	24.9	23.1	24.9	....	27.0	29.1	27.8	29.3	....	5.6	5.7	7.1	7.0	....	70.2	67.7	68.7	67.9	....	26.9	....	....

*Data for November to December, 1920, subject to change.

piled by the Bureau of Railway Economics. During 1920, when the railroad facilities were taxed to handle the business offered them, a campaign was made to increase the miles per car per day and the tons per car. The railway executives set as a mark to try to attain 30 miles per car day and 30 tons per car and intensive efforts were made among the railroad forces and among shippers to try to reach those figures. The mark set for car mileage was not attained,

although an average of 28.5 was reached in October, but with the falling off in traffic these figures were naturally reduced, not only because of the lessening of the pressure but also because the number of idle cars tends to decrease the average.

The mark of 30 tons per car was attained in 1920 in September and again in November, 1920, and January, 1921, but since February the average has been less each month than it was in the corresponding month of 1920 and has remained between 27 and 28 most of the time. The great decrease in the coal traffic, which loads heavily, and the



Revenue Freight Loaded—Cumulative, January 1 to November 19, Inclusive

increase in the volume of l.c.l. freight this year have tended to reduce the average, although the unusually large volume of grain traffic would tend to increase it. The reduction in the average car load must be attributed primarily to the reduced pressure as the available supply of cars has increased.

For the ten months for which the Interstate Commerce Commission reports are available, the car miles per day averaged 22.4 as compared with 24.9 in 1920; the net tons per loaded car averaged 27.7 as compared with 29; the net ton miles per car day 393 as compared with 499 and the net tons per train 656 as compared with 715. The net ton miles per mile of road per day averaged 4,086 as compared with 5,320. With the lighter train loading the train speed has increased from 10.3 to 11.5 miles per hour. The average haul of freight has shown no appreciable change. This figure is available only for nine months. The average miles per revenue ton per road averaged 186.67 as compared with 186.48 in 1920.

Car Surplus

There has been a freight car surplus throughout the year. The car shortage of 1920 began to give way to a surplus of cars about the first of the year and by April 8 the surplus had reached a new high record at 507,000. From that time on the surplus was rapidly reduced, however, and by November 1 had fallen to 80,203 cars. Since then the surplus has been rapidly increasing each week and for the week ending December 15 was 371,221 cars, including 138,214 box cars and 186,508 coal cars.

The chart shows the surplus and shortage of freight cars, classified, during the calendar years 1919, 1920 and 1921 (to December 1) inclusive. Generally speaking, any consequential shortage or surplus of all freight cars during this period affected all classes of freight cars, but not, however, in the same degree. Thus, while the maximum shortage of all cars during this period was about 30 per cent of the maximum surplus of all cars, in the same period, the percentage relation in the case of box cars is about 40 per cent, and in the case of open top cars only about 20 per cent. In flat cars, on the other hand, the maximum shortage just about equalled the maximum surplus and it is also of interest to note that the shortage of flat cars persisted for a longer period than was the case in any other class of freight equipment. The stock and refrigerator car shortages have seldom been sufficiently pronounced to produce any considerable net shortage of these classes of cars, while the surplus in both cases has been particularly marked.

The temporary surplus of all cars in the fall of 1919 and early 1920 is for the most part a reflection of the decreased demand for open top and refrigerator cars at that particular time. The decreased demand for open top cars was the result of the bituminous coal miners' strike. With respect to refrigerator cars it was the normal seasonal decline in movement.

The traffic of 1921 has been handled not only with less cars in existence than in previous years but also with a large percentage of the cars out of service awaiting repairs. According to the latest report of the Interstate Commerce Commission the number of freight cars owned was 2,341,757 as compared with 2,365,122 in 1920, and the percentage of bad order cars has reached as high as 16, although there has recently been some reduction.

Passenger Traffic

The passenger traffic in 1921 has been about 20 per cent less than in 1920 and has been less than in the four previous years for which the monthly figures are available, since about February 1, when the passenger miles fell below that for 1918. While many people have attributed the decrease in travel to the increase in passenger fares, railroad officers insist that it has merely been a natural accompaniment of the general business depression, since so large a proportion of railroad passenger traffic is for business purposes.

The average journey per passenger, during the nine months of 1921 for which the statistics are available, averaged 36.45 miles per road as compared with 38.29 in 1920. The number of revenue passengers per car fell from 20.28 to 16.84.

THE LOUISVILLE & NASHVILLE in the year 1920 and the first nine months of 1921—twenty-one months altogether—killed on its tracks enough live stock to supply a city of 25,000 population with meat for almost two years. The loss incurred was about $750,000. These facts are stated in a circular which has been issued to employees.

Courtesy American Locomotive Company

On the Peking-Kalgan, China—Great Chinese Wall in Background

The Regulation of Securities Under Section 20a

An Analysis of the Decisions in a Wide Variety of Cases—I. C. C. to Be Commended

By Roberts Walker

TWO BILLION DOLLARS is the approximate principal amount of securities passed upon by the Interstate Commerce Commission to the present time. The commission's power to regulate securities began on June 28, 1920. At the time of writing, there has been less than 18 months of regulation. Thus the commission has dealt with an average of over $100,000,000 of bonds and stocks per month. These figures alone indicate the magnitude of the commission's task.

But it is only when these aggregates have been subdivided among the various applicant carriers and among the infinite diversity of their applications that the staggering complexity of the commission's responsibilities becomes apparent. Nearly every carrier in the country, constructed, under construction or hoping to construct, has already been before the commission. Almost every phase of financing has been considered.

Division 4

These matters are dealt with in the first instance by Division 4 of the commission, comprising Commissioners Meyer, Daniels, Eastman and Potter. Their staff, which in June, 1920, embraced some five or six persons, has perforce grown to about 125. The ranking members of this force are: Col. William A. Colston, Director; J. F. Gray, office assistant; C. V. Burnside, legal assistant; G. J. Bunting, accounting assistant; and S. S. Roberts, engineering assistant.

Securities Section: A. Stuard Young, chief, and the following examiners: Pace Oberlin, George H. Gardner, Charles E. Boles, R. H. Jewell, Thos. F. Sullivan, A. Van Meter, A. C. De Voe, J. E. Snider, and Paul E. Loidy.

THE Interstate Commerce Commission in 18 months has passed on securities approximating two billion dollars. It has responded well to the heavy demands upon it.

Experience has shown that federal regulation of securities has not proven as dreadful as many feared it might. Commission regulation has cleared away the atmosphere of suspicion and distrust that has hung over railroad securities.

Relations with the states are still an uncompleted chapter.

The staff of necessity includes accountants and other experts in various lines. No small part of the consideration of each case seems to be, judging from statements in the commission's reports and requirements in its orders, an examination of the commission's own files and accounting records, to see whether the applicant carrier has any matters, pending or decided, that might bear upon the application for securities. Besides this research, the commission has before it all the application papers called for by its regulations, and often calls for other data and, presumably, makes some separate examination of the authorities—legal, financial, market, or what not—pertinent to the application. Oral hearings before examiners of Division 4 itself swell the mass of material to be sifted. In view of all this study of each case, the commission's record for celerity in securities applications is wholly praiseworthy. Rate cases are not, perhaps, fairly comparable; there are usually pleadings to be filed and one or more hearings, on a crowded docket, to be held; and yet it may not be unfair to remark that the reports of rate cases show intervals of from two months to two years or more between submission and decision, while the average securities case has been decided within one month from its submission.

The Methods of Procedure

It is the commission's usual practice to render a "report" and docket an "order" in each case acted upon. These reports vary from formal perfunctory findings to long, carefully stated reasons for the order to be entered. In examining hundreds of these reports, one is struck by the

lack of stereotyped phrases and by the individual character of each report. These are indications of one excellent policy early adopted by the commission, viz.: to deal with each case by itself and on its own merits. This practice is not novel to bankers; but its prompt recognition by the commission as a rule in acting upon security issues is matter for congratulation. In the reports, however, one phrase is "standard," the substance of which is:

"We find that the proposed issue of bonds (or notes, or stock) is (a) for lawful objects within the corporate purposes of the Overland Railway and compatible with the public interest, which is necessary or appropriate for or consistent with the proper performance by the applicant of service to the public as a common carrier, and which will not impair its ability to perform that service; and (b) reasonably necessary and appropriate for such purpose."

This is the fundamental finding required by clause (2) of Section 20a. Two or three provisions are also common to practically all permissive orders, such as

(a) "Nothing herein shall be construed to imply any guaranty or obligation as to said bonds, or interest thereon, on the part of the United States."

This reflects the substance of clause (8) of Section 20a (Sec. 439, Transportation Act, 1920).

(b) "Except as herein authorized to be pledged, said bonds shall not be sold, pledged, repledged or otherwise disposed of by the applicant, unless and until so authorized by our future order."

This phraseology suitably adapted, occurs in authorities to pledge bonds under note issues or to take bonds into the corporate treasury. The obvious intent is to retain control of all securities up to the moment when the sale thereof to the public is finally authorized. Then, of course, they will become like umbrellas in Roswell Field's famous burlesque of Lord Ellenborough's opinion on property rights in same, and "join the world's great common store of securities, whither the Law will not attempt to pursue them."

(c) "The applicant shall, within ten days, report to us all pertinent facts relating to the issue and sale of said securities and the disposition of the proceeds thereof, etc., such report to be signed by applicant's designated officers and verified by their oaths."

We have not used the precise language of any particular order. The phraseology varies with the needs of the case. Sometimes periodical reports during the sale or exchange of securities are ordered. As may well be imagined, these requirements necessitate that the commission keep an elaborate diary and "tickler" system, so that reports may be called for if they do not come punctually to hand and that the commission's oversight may continue till each authority is exhausted.

The application papers in the various cases will probably never be printed in published volumes. It is a pity that not even the reports and orders thus far made have been printed so as to be available to railroad people, bankers and students, but evidently this division of the commission has been too much engrossed in doing its job to see a book through the press. It is understood that a volume will before long be issued, as part of I. C. C. reports, containing many if not all of the reports and orders in decided cases.

Relations with the States an Unfinished Chapter

Relations with the states form an unfinished chapter. No one can yet say where the clash with state regulation of securities will end. A case from Texas is in the U. S. Supreme Court, and a case in Michigan will soon be on its way thither. The New York state courts have thus far decided against the state. The language of the statute is clear: "the jurisdiction conferred upon the commission . . . . . shall be *exclusive* and *plenary*, and a carrier may issue securities . . . . . *without securing approval other than specified herein*" (cl. 7); and provision is made for notice to state commissions, and a hearing, if deemed necessary (cl. 6). Yet the Interstate Commerce Commission's first set of regulations (circular letter June 26, 1920) comically enough contained a requirement that affirmative approval by state authorities be shown or that its absence be explained. Railroads betrayed a strange reluctance to go near their state commissions in the face of the words "exclusive and plenary," and railroad counsel disclosed an equally odd unwillingness to "opine" on that subject. So the definitive regulations (cir. let., revised), issued under date of September 22, 1920, but in actual practice prior thereto, omitted the troublesome reference to state control. Ever since, the commission has gone to the mat on this point with commendable spunk. For instance:

(a) In the New York Central $25,000,000 10-yr. collat. bond case (Finance Docket No. 39), decided September 13, 1920, the commission's report noted that notice had been sent to the governors of all the states in which applicant operates. "No objection to the granting of the authority desired was offered on behalf of any of these states except the state of Michigan. Because of an understanding reached between authorities of that state and the applicant, this objection was not pressed before us." In other words, the "differences were accommodated," as President Wilson would say, and the matter was left for court action.

The Big Four Note Case

(b) In the Big Four note case (F. D. 1086; Dec. 22, 1920), the report shows that Ohio and Michigan asked for dismissal of the application, on the grounds that the commission has no jurisdiction because applicant is a creature of Ohio and Indiana, that the issue of securities does not involve a federal question, that the applicant, not being a federal corporation, is not amenable to the federal government as to its securities issues, and that (in Michigan) the state is financially interested because of fees payable to it on securities authorizations. Whereupon the commission dryly remarks:

"It is well settled that . . . carriers . . . in interstate commerce, although organized . . . as state corporations, are nevertheless subject to our jurisdiction. Section 20a . . . confers exclusive and plenary jurisdiction upon us to authorize the issue of securities. . . . A carrier may, under our authority, issue securities and assume obligations or liabilities . . . without securing other approval.

". . . Section 20a provides that it shall be unlawful for a carrier . . . to issue securities, even though permitted by the authority creating if, unless and until, and then only to the extent that, we authorize such issue. Any security for the issue of which our authority is required, is void if issued without said authority having been first obtained. Upon consideration of the answers of the public utilities commissions of Ohio and Michigan, we are of the opinion that we have jurisdiction."

Then follows a statement, common in other reports, that no objection has been offered by the authorities of the other states concerned.

(c) The Chicago & North Western Equipment Trust report is an instance where a state seems not to have contested the commission's general power, but to have wished to manage a particular detail, to wit:

"The Nebraska State Railway Commission suggested that the authority for the issue of these securities be conditioned upon the payment of the trust certificates out of funds derived from the sale of securities and not out of operating revenues. This suggestion is intimately related to the question of proper provision for depreciation which we now have under investigation. It will receive consideration in that connection."

(Readers familiar with the struggles of the Commission, ever since 1906, to express rules on depreciation, will be forgiven if they smile at the thought that the state of Nebraska is to be added to those who are watchfully waiting for the determination of the depreciation policy of the commission).

Other instances could be cited, all establishing that the commission now asserts and exercises its sole jurisdiction, in supersession of state commissions, over railroad securities.

The matter just discussed doubtless has sound legal foundation. Where the federal government has moved into an area which, by our Constitution, it has a right to control, it will usually be held to have taken entire authority over that area. As an element of the power "to regulate

commerce," this assumption of control of railroad securities should and probably will be held to have ousted the states from such control as they have previously exercised.

The Charter Powers of State Corporations

But there is another cognate matter that is not so clear, viz., whether the charter power of state corporations may be deemed to have been enlarged by Section 20a. The present regulations require that an attested copy of its charter be filed by each applicant carrier, and that carrier's counsel's opinion shall show that the issue "is or will be legally authorized and valid if approved by the commission. In such opinion specific reference should be made to any provisions of the charter . . . . upon which special reliance is placed."

The carrier's fundamental law may provide that bonds may not be issued in excess of two-thirds of the outstanding stock, or may not bear more than a stated rate of interest; or may prohibit the issue of convertible bonds; or may otherwise restrict certain financial expedients. Can the commission in effect supplement the charter granted by the state, by permitting the carrier to do that which the state restricts or prohibits? The question has not been settled. From the commission's requirements just quoted, it can be deciphered that the authority granted and limited by the states is deemed of grave consequence (except only as to the exclusive and plenary power to authorize securities issues). But might not "plenary" power include the right to authorize financial programs not countenanced by a carrier's state? The question must some day be answered.

It was dealt with, in a negative way, in the Lackawanna's stock dividend case (where no state authority interposed objection). The commission went comprehensively into the Lackawanna's statutory power. "Whether or not applicant is prohibited from issuing stock dividends by its charters is not clear. Counsel stated that he knew of no provision which would permit such dividends." Relying upon Section 20a, the commission authorized the capitalization of part of the surplus through the declaration of a stock dividend. That is to say, the commission authorized the exercise of a power not expressly granted by state law. But whether, in an equally persuasive case, the commission would go counter to state law, seems not to have been conclusively settled.

The Matter of Valuation

One other general question is in an unsettled state: the matter of valuation. What part is it to play in the regulation of securities? Many have held the theory that valuation would disclose and limit the amount of securities that a carrier could sustain; and that such limitation would hold down rate increases, by minimizing the interest and dividends to earn which rates are, presumably, fixed. But here we are, with scarcely any valuations established, and the commission busily authorizing securities issues. Their reports disclose hardly any cases where valuation is a determining factor. On the other hand, it is plain from their reports that value of property is often taken into account. The lack of basic evidence of value must be a considerable handicap. Book value is sometimes taken into consideration: the Detroit & Toledo Shore Line application, to issue additional stock, was denied on the ground that the evidence did not show that the value of the road and equipment, plus working capital, materials and supplies, exceeded the then existing capital.

In the Lackawanna stock dividend case, the report contains much discussion of expenditures made from surplus. The prevailing opinion (for the case seems to have been heard before the whole commission) contains an express finding that "the evidence establishes . . . . . that the present capitalization is below the actual investment or fair value of the property." The surplus on the books was about $90,000,000, but the commission allowed a stock dividend of only $45,000,000. Commissioners Daniels and Potter wrote opinions to the effect that, on the commission's own theory, a larger stock dividend and a smaller remaining surplus would have been permissible. (Commissioner Eastman's dissent was on the same ground as in the Burlington case, that capitalization of surplus ought not to be permitted). Thus the commission affirmatively found ample values for the stock dividend permitted or even for a larger dividend; value was conceded, and the real point was how much surplus ought to be left.

In a small application from Pennsylvania, the Williamsport & North Branch, the report recited that the investment of the foreclosed company, as shown by its books, was $2,000,000, while the proposed securities aggregated $900,000; and the purchasing committee was allowed to receive these $900,000 new securities in exchange for the railroad bought by them at foreclosure sale. In the Chicago & Eastern Illinois reorganization (F. D. 1146), the commission virtually allowed the securities because they improved the financial set-up, their report stating:

> "Under the plan of reorganization, the total capitalization will be $91,321,150. The valuation of the property which will be taken over by applicant has not yet been completed, so that it is not practicable to compare this capitalization with underlying value. It is clear, however, that the proposed new capitalization will be relatively lower, even when allowance its made for the properties which are not to be taken over, than the outstanding capitalization of the old company, and that the fixed charges will very materially be reduced, with a subsequent improvement in credit. The evidence also indicates that the new capitalization will not be disproportionate to the earning power of applicant. Under these circumstances, in view of the manifest desirability of ending the long period of receivership, we think that approval ought not to be withheld because of lack of complete information as to the value of the property to be taken over by applicant."

The report in the Kansas, Oklahoma & Gulf reorganization matter states that no evidence was offered as to the value of the property and that it is not now practicable to determine such value, but that in this instance the commission was asked only to give effect to the reorganization plan devised by the late U. S. District Judge William C. Hook. Valuation and its corollary, earning power, have figured in one or two denials of applications for loans under Section 210 of the Transportation Act, 1920. A loan of $42,250 to a short line railroad was refused because of deficits in net income and of the doubtful earning power and security of the carrier. In another such refusal, the same ground was stated, and the commission seems also to have taken judicial notice of the fact that a railroad built in 1913 would be confronted in 1920 with the period of its heaviest operating expenses.

Generally speaking, however, the commission refrains from mentioning valuation. Whether it will make more of the matter when valuations have more generally been determined, remains for the future to disclose.

Reorganizations

In considering valuation, the subject of reorganization naturally comes to mind. It is elementary, on the theory underlying Section 20a, that a new company should not embark upon business with securities in excess of demonstrable valuation; it is also clear that the effectiveness of the commission's control over railroad securities would be lessened if upon a reorganization securities should be authorized grossly in excess of fair valuation. The commission has had so few reorganization cases before it, that it is unsafe to generalize. The cases of the Williamsport & North Branch and the Kansas, Oklahoma & Gulf, above referred to, contain nothing of special interest, as neither had anything to do with priorities and liens. Those two and the Chicago & Eastern Illinois case, however, do indicate one practice that is of considerable comfort, viz., the focussing of the commission's attention upon the new company and its securities, and limiting its report and order

to the new company's issues. The foreclosed or reorganized company and its securities are left, where they belong, to the court in which the receivership or other proceeding is pending. Hence the commission passes upon the classes and aggregate of the new company's securities, and any special terms, if there be any, connected with the new issues; but has not thus far concerned itself with the basis upon which an old security-holder is to receive new securities under the reorganization plan.

In the Chicago & Eastern Illinois, the commission's report stated that "holders of small blocks of bonds have protested against the plan of exchanging bonds for stock. This is a matter properly to be brought before the court having jurisdiction in the premises, which have expressly reserved the determination of the equities in the receivership proceeding." In the same case, no other mention appears in the report of the basis on which the new securities are to issue. The questions of reorganization expenses, underwriting, etc., seem not to have been raised. The new securities and the assumption of certain old issues are the consideration for the purchase by the new company of most of the mileage of the old company. The commission finds that the aggregate of securities and the annual fixed charges will be less under the plan than they were with the old company's securities. The order requires the new company to file full reports of the issuance of securities, specimens of each type of security, copies of each indenture, etc. A time limit to the authority was fixed, which has been once or twice extended. The details of certain of the securities have been authorized to be changed. These matters are mentioned as indicating that the commission quite properly does not give authorities running too far into the future, but is flexible and reasonable about extensions and changes.

As to the other pending reorganizations of receivership properties, it is understood that the Missouri, Kansas & Texas authority has not yet been formally requested. The Denver & Rio Grande Western (purchaser at the D. & R. G. sale) has received authority to issue shares without par value, but appears to have received no authority as to bonds, nor as to assuming the bonds subject to which it took over the railroad. The report of the commission refers with considerable detail to the court proceedings, objections by stockholders, etc., and finds the Western Pacific holding company not within its jurisdiction under Par. 2 of Section 5 of the Interstate Commerce Act as amended.

Voluntary Refinancing of Roads Not in Receivership

There have been a few cases of voluntary refinancing of roads not in a receiver's hands. The Lehigh & Hudson River Railway Company was authorized to issue and sell $2,987,000 stock, for the purpose of retiring all its bonded indebtedness. The El Paso & Southwestern Railroad Company was authorized to issue capital stock without par value, in exchange, three shares of new for one of old, for stock with par value then outstanding. The refinancing of the "Burlington Joint 4's," as is well known to the business world, was passed upon by the commission in the early months of 1921, and the requisite Great Northern and Northern Pacific issues authorized to make the refunding possible.

Securities for New Enterprises

With railroad construction so nearly at a standstill, the applications for authority to issue the securities of a new enterprise have not been many. Doubtless the commission has had one or two such before it that have never reached the stage of report and order or have been withdrawn. In such cases is also involved a "certificate of public convenience and necessity" under Sec. 402 (I. C. C. Act, Sec. 1, new par, 18). The way in which new enterprises are dealt with will be watched with keen interest. States that have regulated securities have found one of their greatest difficulties in liberalizing new issues so as to make the program inviting to capital. Texas created a state of affairs where practically all railroad building had to be done by foreign corporations—the very thing the statute sought to prevent—because no reward was in sight for local capital. The old problem of a suitable amount of bonus securities to represent earning power, promoter's profit, or whatever one may call it, seems to remain to be considered by the commission.

Discretion Exercised Upon Strictly Business Questions

Some hopeful augury may, perhaps, be spelled out from the wide range of authority granted, and of discretion exercised upon strictly business questions. One of the early cases before the commission was the New York Central $25,000,000 10-yr. 7 per cent bond issue (F. D. 39; Sept. 13, 1920). The Association of Railway Executives was represented by its counsel, and the banker also had such counsel. The commission in a way served notice that consummated trades should not be brought before it for mere ratification, by stating:

"It developed at the hearing that the proposed collateral trust bonds had been sold on August 20, 1920, subject to our authorization. While the law does not prohibit such a conditional sale in advance of approval of an issue of securities, carriers should realize that we shall not be controlled in our action by representations that failure to accord approval of issues conditionally sold will result in disturbance or disarrangement of plans based upon anticipated approval."

But this attitude does not seem to have meant that the commission desires to do any of the trading. It has been interpreted and acted upon as meaning that parties should trade subject to the commission's order, or after the authorization has been granted. Yet the commision is by no means unwilling to keep an eye on the market. In one or two reports, the authorized price is higher than the price stated in the application. This must mean that somebody made a better offer or that the commission ascertained that the price was too low and insisted on raising it. In the New York Central case above cited, the commission's remarks on price, underwriting, commissions, etc., are well worth citing *in toto:*

"The facts in regard to the sale are briefly these: It was made without competition. Applicant dealt only with J. P. Morgan & Company and accepted that firm's agreement to 'endeavor to form a syndicate to purchase from ourselves and associates at 97 per cent and accrued interest and offer for public subscription at par and accrued interest.' If this endeavor proved successful, J. P. Morgan & Company agreed to buy the bonds at 96.5259 per cent of par and accrued interest, or, in other words, upon a 7½ per cent basis. The 'associates' mentioned in the agreement were eventually the National City Company and the First National Bank of New York. The evidence shows that on August 18, 1920, J. P. Morgan & Company, by wire and letter, invited various dealers in investment securities throughout the country to become members of the syndicate, notifying them of the amounts of their participation, to which they were to signify their assent by 10 o'clock of the morning of August 20, when the subscription books were to be formally opened. Out of 428 dealers to whom the invitation was sent, including J. P. Morgan & Company, 403 accepted. The subscription books were closed within two hours of their opening, and there were 6,473 subscriptions, at par and accrued interest totaling $39,393,500, an oversubscription of more than 50 per cent. The evidence shows that the contract of conditional sale between J. P. Morgan & Company and applicant was not consummated until after the formation of the syndicate on August 20.

"The entire cost to the applicant of marketing the issue was the difference between the par value of the bonds and the sale price to J. P. Morgan & Company, this difference being $868,525, plus small amounts for taxes, legal services, and the engraving of the certificates. J. P. Morgan & Company received as syndicate manager $118,525, which was divided with its associates, and out of which it paid certain clerical expenses, but none of the other expenses of the syndicate. The syndicate members who placed the bonds with investors received from the syndicate for such services a commission of 1½ per cent on all sales within the amounts allotted to them and a commission of 2 per cent upon sales in excess of the allotments. After deducting these commissions and the expenses of the syndicate, the portion of the $750,000 remaining was distributed to members of the syndicate in proportion to their allotments. This profit amounted to about 1.1 per cent. Out of the 403 syndicate members, 26 sold no bonds. The distribution of the $750,000 is shown in the following table:

Gross profit of 3 per cent		$750,000
One and one-half per cent straight selling commission on $25,000,000	$375,000	
One-half per cent extra selling commission on $10,026,000	50,130	425,130
		$324,870
Legal expenses, advertising, etc.		50,000
Net profit or 1.09948 per cent of $25,000,000		$274,870

"It appears that the main items of expense comprising the $50,000 were approximately $27,000 for advertising and $15,000 for legal services.

"Conditions arising out of the war have radically changed the character of the investment market. Evidence was offered to the effect that owing to the heavy income tax the tendency of large individual buyers is to purchase taxfree securities. High returns promised in competing lines of investment deter some investors from investing freely in railroad securities. Higher margins on the placement of certain competing investments also incline distributors to prefer the placement of the latter. The banks, moreover, find it necessary to use their funds chiefly for commercial purposes. To a much greater extent than heretofore railroad securities must, therefore, be sold to small buyers, and this makes necessary more comprehensive and expensive machinery of distribution. Applicant testified that it had no means of effecting such distribution upon its own account, and that it resorted to J. P. Morgan & Company because of that firm's prestige and experience, and established connections with investment houses all over the country. In other words, Morgan & Company acted as middleman between the corporation and the distribution machinery necessary to place so large an issue of securities, and in the opinion of applicant the issue could not have been effected in any other way. Evidence was also offered by representatives of investment houses as to the greatly enhanced cost at the present time of distributing securities, because of increased salaries, higher rents, the necessity of appealing to a wider field of investors, and other factors entering into the conduct of the business.

"We have thought it necessary to set forth in detail the circumstances and cost attending the marketing of the proposed issue, because the assurance of reasonable terms afforded by competitive bids was not present. In saying this we realize that, under the conditions prevailing in the financial world, applicant probably could not have obtained the advantage of open competition; but this fact merely emphasizes the necessity of our considering in this and all similar cases the terms of sale which we are asked to approve. In the present instance, in view of the small financial risk and the apparent ease with which the subscriptions were obtained, we think the discount at which the bonds were sold was liberal. The evidence, however, is not sufficient to justify a conclusion that the cost of floating the issue was such that we ought, under all the circumstances, to withhold approval of the terms and conditions set forth in applicant's petition.

"The subject matter is plainly one deserving of attention, and it is desirable that carriers intending to present applications for the approval of security issues should appreciate that the proposed terms and conditions will be the subject of our careful consideration."

As specimens of prices actually authorized, there may be mentioned: Equipment notes, average maturity 7¾ years, at 8 per cent basis; mortgage bonds on a 7.75 per cent basis; 6 per cent bonds with 2 years to run at 90.

The Scope of Authority

As to the scope of its authority, the commission seems to act on the sound theory that if it doesn't assert jurisdiction over everything, it may miss something. This position has brought before the commission quite an assortment of oddments. For instance, the matter of dollar bonds in conversion of sterling bonds under a mortgage and bond issue preëxisting federal control of securities. In an Oregon-Washington Railroad & Navigation application, the report said:

"While it is not our intent to find the proposed conversion in substance accomplishes anything more than a change in form of existing liabilities, we are of opinion that the delivery of dollar bonds in exchange for sterling bonds . . . involves an issue of securities within the meaning and purpose of Section 20a of the Interstate Commerce Act."

The same ruling was made in a Union Pacific case and in an Atchison, Topeka & Santa Fe case, the latter involving the feature that the fixed rate of exchange provided in the mortgage resulted, upon conversion, in an increase of obligation of $26.70 per $1,000 bond. Even bonds issued into the carrier's treasury, not sold or pledged, must obtain authorization (B. & O. Refunding & General Mortgage bonds, for example. A carrier that had issued, subsequent to June 28, 1920, without commission authority, $50,000 of promissory notes was given authority to retrace its steps, cancel the guilty notes and issue innocent ones. Refusal to issue bonds to finance a purchase of another railroad has been denied where the purchase had first been made without obtaining the commission's approval. A subordinate refunding operation, the issuance of Rock Island General Mortgage bonds, which can be used only for pledge under and refund into the First and Refunding bonds, receives the commission's approval.

A more burdensome income tax provision was authorized to be inserted into some O-W R. R. & N. bonds; this was another instance of increase of obligation. The issue of stock upon conversion privileges has been permitted to the Southern Pacific Company, the Atchison, the Norfolk & Western, the Wabash, the Delaware & Hudson and the Chesapeake & Ohio. Fractional bond scrip in such cases has also received formal sanction. The issuance of further preferred stock under a consolidation of corporations made in 1906 was withheld by the carrier until commission authorization had been granted (Chicago & Alton). The New Orleans, Texas & Mexico case may be taken to indicate that the commission does not deem the provisions of a mortgage beyond the scope of its authority. There the mortgage permitted bonds for betterments to be drawn down on the basis or price of not less than $950 per $1,000 bond. The commission, however, refused to allow a principal of bonds in excess of the cash actually expended, and cut the application from $561,800 to $533,700.

Pledge of Bonds for Short-Term Notes

Railroads with treasury bonds often wish to pledge them for short-term loans. The loans (if they do not overrun the two year and 5 per cent limitation of paragraph 9 of Section 20a) do not require commission authority. But the pledge does. The commision has granted a number of permissions of this sort, and has changed some of them from time to time to fit bond market conditions. In a Rock Island case, the authority first granted was to pledge not over a stated par amount of bonds per each $100 of loan. Later this was changed to permit not over $125 of bonds at *market* value to be pledged per $100 of loan. This, as will be observed, is the wholly familiar rule for maintaining "margin."

With the recent improvement in the bond market, sensible provisions like these have resulted in lessening the amount of bonds to be pledged per $100 of loan, but of course would operate the other way if the bond market were getting weaker. General permissions to pledge bonds have been given to the B. & O., the Frisco, the Illinois Central, the L. & N. and a number of other carriers, not to mention specific authorities to many carriers of issues of collateral notes.

We have seen the commission's attitude on stock dividends in the Lackawanna case where, roughly, half of the dividend asked for was allowed. The Burlington application for leave to declare a bond dividend had even harder sledding. Six opinions were written by as many commissioners, and the prevailing opinion was careful to limit the scope of the refusal of permission, in these words:

"No one questions the right of owners to compensation for sacrifices made in foregoing dividends. The denial in this case extends only to the issuance of a bond dividend by a railroad which has no need for the bonds, and which can advantageously issue all the stock reasonably required for its needs. The more adaptable form of mortgage which the applicant desires can be provided without the issuance of a bond dividend."

There is an echo here of the argument that the rule should be "fewer bonds and more shares." Commissioner Eastman, in both the Lackawanna and Burlington matters vigorously dissented. He believes that "undercapitalized railroad corporations are a source of strength to the nation, and they are all too few."

Stock Issued at Less Than Par

It is an interesting thing that Section 20a puts the emphasis on value, rather than on par value. There is nothing in the section to indicate that stock may not be issued, in a persuasive case, at less than par. No square instance has been found, but the commission has the right to consider the carrier's charter and, if it interpose no difficulties, to authorize stock to be sold below par. The treatment of an issuance of investment preferred stock, should such be brought before the commission, would demonstrate the commission's attitude, in case, as often happens, there were a sale price below par or a banker's commission that brought the net proceeds below par.

Other Activities

The scope of this article does not embrace the other activities of Division 4. Among such are the consideration of proposed abandonment of lines of railroad, applications for loans from the United States, applications for certificates of convenience and necessity to construct new lines, and leave to hold directorships on more than one board. As evincing the efforts of the commission to be helpful, however, attention is called to F. D. 2, decided Nov. 22, 1920, as to loans to carriers by the United States. The commission there held that inability to procure funds elsewhere, within the meaning of Sec. 210, does not mean an absolute inability, but a practical inability within the sound business discretion of the commission with a view to the public interests involved, and to determine on the facts of each case.

Two good illustrations of permission to trunk lines to acquire shorter lines are afforded by the Minneapolis, St. Paul & Sault Ste. Marie application to buy, with its bonds and some cash, the Wisconsin & Northern (F. D. 1288) and by the application of the Chicago, Milwaukee & St. Paul for leave to acquire control of the Chicago, Terre Haute & Southeastern by lease and purchase of capital stock (F. D. 1383).

Conclusion

The conclusion of the survey must be that on the whole, federal regulation of securities is not so dreadful as many feared that it might be. It is fortunate that the power began to be exercised at a time when difficult financial conditions were not peculiar to this or that carrier, but were concededly almost universal. The commission has responded well to the demands upon it, and has done its best to facilitate financing.

In no carping spirit, we may be permitted to remark that some of the commission's past pronouncements gave no promise of any such breadth of vision. Its earlier reports on investigations of the financial conditions of carriers might have been written by doctrinaire professors or by prosecuting attorneys, so little some of them contained of judicial poise and of appreciation of the other fellow's problems. Only those who have worked years endeavoring to carry along a handicapped enterprise can realize how nearly all the financing was done under stress of dire financial conditions and how little of it, if any, was done with any purpose to deceive investors or injure the public. Yet the latter theory was usually the underlying thought of the commission's old reports. In the Frisco investigation, for instance, there was criticism because bonds were sold in the face of known insolvency. Recently, on the other hand, the commission authorized the Central Vermont to renew obligations *for the purpose* of averting receivership. There may have been differences between the two cases, but their spirit is identical. Each carrier was seeking to patch a rent. Verily, responsibility does sober public men.

To cite the Frisco report again, it maintains throughout an attitude toward bond discounts that would lead any student to believe that the commission deemed them somehow heinous. Yet, since Section 20a went into effect, the commission has unblinkingly authorized many bond discounts, and prices of 90 and even 80 have not been unheard of. All these point to a great improvement in the public attitude toward railroad securities. The commission's regulation of them and of other carrier activities, may not make the securities intrinsically worth any more, but at least it has cleared away the atmosphere of suspicion and distrust that had hung over railroad securities, arising, no doubt, in some degree from the commission's own public attitude in securities matters passed upon by it. Let us hope the new attitude will work well for carrier finances.

General Railroad Developments During the Year

(*Continued from page* 13)

of the Transportation Act by a prediction that the condition of the railroads would be improved in the future.

Roads Propose Cut on Agricultural Products and Ask General Investigation

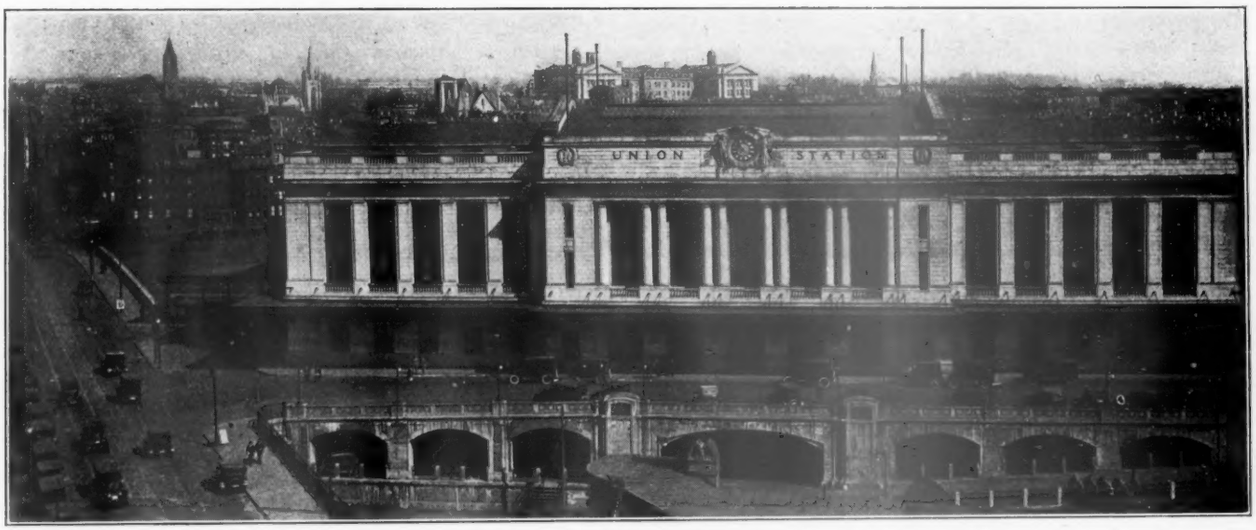
The railroads failed to file the new grain tariffs and the executive committee of the Association of Railroad Executives held a conference with the Interstate Commerce Commission on November 12, the nature of which was not disclosed. As a result, however, the roads at a meeting in New York on November 15 announced their intention of asking the commission to reopen the western grain case to allow them to substitute a general 10 per cent reduction for six months on agricultural products except in New England, and to make a general investigation as to whether any further reductions in rates could lawfully be ordered in view of the financial condition of the carriers.

Commission Orders Rate Investigation

Before the petition was actually filed the commission issued a formal order in the grain case that the reductions be made on or before December 27; on the day that it was filed, November 23, the commission issued an order for a general investigation to determine whether and to what extent, if any, further general reductions in rates can lawfully be required by order of the commission. The commission did not refer to the carriers' petition. It did issue a notice referring to various petitions that had been filed by various interests asking the institution of investigations more or less general in scope, with a view to effecting reductions in rates on various descriptions of traffic, and also to the proposal of the carriers for a 10 per cent reduction on agricultural products. It was also stated that the order was along lines under consideration by the commission for some time past. On November 29 it was modified to include the question as to what percentage will constitute a fair return after March 1, when the 5½ per cent figure provided in the law expires.

On December 3 the commission responded to the request for permission to file the 10 per cent tariffs and on December 9 it announced that the petition for a rehearing in the grain case would be set for oral argument on December 14 at the opening of the hearing on the general investigation. At the hearing the railroads asked that the grain order be suspended for six months, but on December 16 the commission denied the petition for a rehearing, which put it up to the roads to make both the 10 per cent general reduction and the still greater reduction on hay, grain and grain products west of the Mississippi river.

The hearings in the general investigation began on December 14, the first week being given over to the testimony on behalf of the railroads, after which an adjournment was taken to January 11. The prospects of the railroads for the new year, therefore, are largely dependent upon the conclusions which will be reached by the commission as a result of its investigation.



Union Station, Baltimore—Photo by Ewing Galloway

The I. C. C. Regulation of Security Issues

All Issues Since June 27, 1920, Have Been Subject to Approval by the Commission

By Harold F. Lane

ONE OF THE NUMEROUS new conditions created for the railroads by the passage of the Transportation Act of 1920, under which they were returned to private management, was that authority had been given to the Interstate Commerce Commission to regulate their issues of securities.

There had been much agitation for many years for some such regulation, arising mainly from the disclosures of some of the methods of high finance which were made in various investigations of financial scandals. In many cases these investigations merely resulted in additional publicity and an official location of the responsibility for transactions that had been carried on quite openly and without much criticism until they turned out badly. The demand for laws to make their recurrence impossible in the future led to the appointment of the Railroad Securities Commission in 1910 to make recommendations. At hearings before this commission, many representatives of the railroads welcomed the idea of federal regulation on the subject as a substitute for the regulation by various states which had attempted to deal with the subject with varying degrees of intelligence and a total absence of uniformity. The railroad officers, however, urged that the regulation or supervision to be undertaken should not attempt to go farther than necessary and pointed out how their financial operations would be hampered if opportunity for taking advantage of a favorable market were to be delayed by prolonged deliberation by a commission.

The Railroad Securities Commission accepted this point of view and in its report submitted in 1911 it recommended against a system of regulation by the commission as not warranted at that time. It expressed a belief that accurate knowledge of the facts concerning issues of securities and the expenditures of the proceeds is of the most importance and recommended that railroads should be required by law to file detailed reports on these points with the commission. These recommendations were hardly drastic enough to suit those who had been agitating for the regulation of financial transactions of the carriers and there was also much controversy over the question as to whether federal regulation should be made exclusive or merely superimposed upon that of the states.

The House of Representatives in 1914, and again in 1916, passed the Rayburn bill, but it was not passed by the Senate. There was a good deal of discussion on the subject during the hearings before the Newlands joint Congressional committee in 1916, in which the railroads went so far as to advocate federal supervision of security issues to escape from the vagaries of state regulation, but some doubts were expressed in Congress as to whether the federal government could constitutionally assume exclusive jurisdiction over the security issues of state-chartered companies.

The discussion was dropped when the Newlands committee's investigation was interrupted by the war. After it had been decided that the roads were to be returned and a new law was being formulated in an effort to bring about some improvements over the pre-war system of railroad regulation, the provisions relating to security issues were adopted with

THE Interstate Commerce Commission during the year ending October 31, 1921, authorized railroad security issues in the following aggregate amounts:

Stocks	$242,657,500.00
Bonds	1,276,761,616.39
Notes	98,402,194.79
Miscellaneous	97,780,313.24
Total	1,715,601,624.42

comparatively little new discussion, the Rayburn bill being taken as the basis, although many changes were made. No one was objecting to the regulation of security issues and there had been no recent scandals to cause any particular affirmative demand for action. There was a rather strong sentiment at the time, however, for concentrating the regulating authority more closely in the hands of the Interstate Commerce Commission and for treating the transportation system of the United States as a national system. While the state commissions opposed bitterly the idea of curtailing their authority over rates in any way, most of them were willing to give the Interstate Commerce Commission a jurisdiction which many of them had never attempted to exercise.

The commission's jurisdiction was made, therefore, "exclusive and plenary."

The Hadley securities commission had said that if securities were to be issued only after specific authorization by the commission it was difficult to see how the government could escape the moral, if not the legal, obligation to recognize them in regulating freight rates, but this objection was probably obviated by the provisions of the Transportation Act which based rate regulation on the value of the property rather than upon securities. The provisions of the act relating to security issues, which are included in Section 20-a, became effective on June 27, 1920.

Provisions of the Law

The law provides that after its effective date it shall be unlawful for any carrier to issue securities or assume obligation or liability in respect of the securities of any other person, even though permitted by the authority creating the carrier corporation, unless and until, and then only to the extent that, upon application by the carrier and after investigation by the commission of the purposes and uses of the proposed issue and the proceeds thereof or of the proposed assumption of obligation or liability, the commission by order authorizes such issue or assumption. The commission is to make such an order only if it finds that such issue or assumption; (a) is for some lawful object, within its corporate purpose and compatible with the public interest, which is necessary or appropriate for or consistent with the proper performance by the carrier of service to the public as a common carrier, and which will not impair its ability to perform that service, and (b) is reasonably necessary and appropriate for such purpose.

The commission is authorized to grant or deny the application as made or in part or with such modifications and upon such terms and conditions as the commission may deem necessary or appropriate. It also may make supplemental orders modifying the provisions of the previous order. These provisions do not apply to notes maturing in not more than two years aggregating, together with other then outstanding notes of maturity of two years or less, not more than five per cent of the par value of the securities then outstanding. A certificate of notification regarding such notes is to be filed with the commission within 10 days. The commission is directed to require periodical or special reports from each carrier showing in detail the disposition made of securities and the application of the proceeds.

Bureau of Finance

To administer these as well as other related provisions of the law, the commission created a Bureau of Finance under the direction of Col. W. A. Colston, formerly general solicitor of the Louisville & Nashville, and this bureau soon grew to be one of the busiest in the commission's organization. Its other functions have to do with the administration of the $300,000,000 loan fund, the determination of the six months' guaranty, the issuance of certificates of public convenience and necessity for construction or abandonment of lines, and acquisition of control of another carrier.

During the first months of its existence its time was largely occupied with matters pertaining to the loan fund and the guaranty. During the past year, however, its functions with relation to the authorizing of security issues have assumed a greater importance. On June 26, 1920, an order was issued by the commission which was revised on September 22, 1920, prescribing the form of application to be filed by a carrier for authority to issue securities and stating the character of supporting papers required to be filed therewith. It also prescribed the form of notification, when short term notes have been issued which do not require the authority of the commission. On September 2, 1920, an order was also issued prescribing "Special Report Series Circular No. 29" for use by carriers in reporting securities issued or assumed at the close of June 27, 1920.

In its annual report for the year ending October 31, 1920, the commission stated that 61 applications for authority to issue securities had been received, 28 had been granted, 1 had been withdrawn and 32 were pending. Forty-three certificates of notification had been filed under paragraph 9 of Section 20-a, representing the issuance of notes maturing in two years or less of an aggregate amount of $28,542,764.

Securities Authorized

The annual report for the year ended October 31, 1921, showed that 283 additional applications had been received since the previous report, making a total of 344, and the issue of securities totaling $1,715,601,624, largely for refunding purposes, has been authorized. Certificates of notification of the issuance of short-term notes to the amount of $137,502,723 also were filed.

Most Applications Approved

As it is impossible to estimate how many financial crimes may have been prevented by the fact that the railroads have been required to obtain an official O. K. upon their plans before proceeding with them, it would be difficult to estimate how much good has been accomplished by the commission's supervision thus far. In most cases the commission has approved the applications, although in one or two conspicuous cases it has not. As to the instances in which the commission has substituted its own judgment for that of the railroad managements and their financial advisers there are probably varying opinions as to which was the more correct.

One feature of the situation that attracts attention is the delay and the amount of paper work required to obtain authorization of even simple transactions. Undoubtedly, however, much of the delay that has been experienced during the past year has arisen from the fact that both the commission itself and its finance bureau have been overwhelmed with work and have had to go through the usual experiences involved in administering a new statute. Many questions arising from differences of interpretation of the law have come up to cause delays which may be obviated in the future and the commission has also had to build up a new organization to deal with the financial matters. With each application a large amount of supporting data is required to be furnished and with many of the applications the exhibits filed have been very voluminous. Many of the simpler cases have been passed on very quickly, but naturally each one requires a considerable amount of checking within the organization of the bureau and where questions arise it is often necessary to conduct hearings. The number of cases in which there have been no hearings far exceeds those in which hearings have been held and the hearings, except as to a few applications, have been largely ex parte.

The decisions are usually rendered by Division 4 of the commission, Commissioners Meyer, Potter, Daniels and Eastman, but in case of disagreement among them, cases are passed upon by the entire commission.

The Burlington Case

The most conspicuous example in which the commission declined to grant the application made by a railroad was that involving the refinancing by the Great Northern and Northern Pacific of their purchase of most of the stock of the Chicago, Burlington & Quincy, made by James J. Hill 20 years ago. The two companies had outstanding some $215,000,000 of joint 4 per cent collateral trust bonds secured by the deposit of 97 per cent of the Burlington stock, which, paying an 8 per cent dividend, carried itself for the two roads. The bonds came due, however, on July 1 and it would obviously require a higher interest rate to refund them, while the two northern companies had no way of paying them off, except by selling or forfeiting the Burlington collateral and giving up their control.

After a great deal of planning and consultation with bankers, a plan was evolved by which the Burlington was to be made to pay in part for itself by the use of part of the large surplus it had built up by making extensions and improvements out of earnings without capitalizing them. The commission was asked to approve an issue of $60,000,000 of Burlington stock to be used as a stock dividend, most of which would go to the two northern lines, and a new mortgage, which the Burlington needed anyway, and under which the commission was asked to authorize an issue of $80,000,000 of bonds, against expenditures made out of income, to be also used as a dividend.

Both issues were designed to bring the Burlington capitalization nearer to its value and the proceeds of the bond issue were to be used to reduce the amount of bonds to be issued against the Burlington to approximately $140,000,000. It was argued that this would result in a saving of interest charges for the three roads considered together as compared with the cost of refunding the entire issue of joint bonds, although it would increase the fixed charges of the Burlington. The application was filed with the commission about November 1, 1920. Extensive hearings were held, at which the plan was opposed vigorously by the state of Nebraska.

After long consideration within the commission's organization, during which several reports of various kinds were written by subordinates, the commission on February 28 issued its decision in which a majority approved the $60,000,000 stock issue, which was of no particular value since it was not desired to sell the stock, but disapproved the bond issue for dividend purposes, which was the most important feature of the plan. The commission was much divided in opinion. Eight members approved the stock issue, but only four approved the bond issue, and there were several dissenting and partially concurring opinions.

This made it necessary for the railroads to work out a new plan and get it approved in time to meet the maturity of the bonds by July 1. On March 25 a new plan was proposed which the commission later approved, providing for a new joint bond issue of $230,000,000 at 6½ per cent to refund the entire amount of the joint 4's, secured by both the Burlington collateral and in addition by $33,000,000 of mortgage bonds of each of the two northern companies, but with provision for conversion of the joint bonds into the individual issues of the two companies. This was approved by the commission on April 21 and the exchange and sale of the new joint issue was successfully made, although at a considerable increase in interest charges as compared with the earlier plan.

Later on when the two northern companies needed additional funds with which to maintain their usual dividend disbursements, the Burlington went to their assistance with an increased cash dividend, which it was able to declare without obtaining the approval of the commission, and the Burlington is now before the commission with an application for a bond issue to meet its own capital requirements. This entire transaction illustrates in an exaggerated degree the possibilities for delay which are inherent in a system of commission regulation of security issues, although on the other hand, no comparison is available as to the time that would have been required if it had been necessary to obtain approval for so complicated a plan from the various state authorities. The same observation applies to many other cases in which a considerable length of time has been taken by the commission to pass upon the carriers' applications.

For a transaction involving one of the largest corporate issues ever made the Burlington financing attracted very little public attention. The newspapers devoted little space to it and the public hearings were not reported in the daily press. As the commission was so closely divided as to the lawfulness and propriety of the original plan which was disapproved, its majority opinion presumably carried little, if any, more weight than did the opinion of the minority and there is probably as much room for argument now as existed before as to whether the Burlington should have been allowed to issue a bond dividend.

No public criticism of the commission's decision was made by representatives of the interested railroads and apparently they attached more importance to finding a feasible plan to which the commission would give its official approval than to any particular plan in detail.

The commission in the Burlington and one or two other cases did establish one principle as to which there has been much argument in the past, in authorizing the issue of stock for the purpose of capitalizing improvements made out of surplus earnings. This question was made an issue in the Burlington case both by the representatives of Nebraska, who opposed it, and in the opinion by Commissioner Eastman, the argument against the plan being that the surplus was rather held in trust for the public than the property of the stockholders.

The Lackawanna Case

The same point was involved in the application of the Delaware, Lackawanna & Western for authority to issue approximately $90,000,000 of additional stock, representing the amount of its surplus, as a stock dividend. In the case of both the Lackawanna and Burlington, it had been common knowledge that the capitalization had been kept at a very low point, as compared with the value of the properties, which had been gradually built up out of earnings and in the Lackawanna case there was no real opposition to the application. The commission did not allow the full amount of the issue applied for but after having the case under consideration for about seven months, it finally on April 18 authorized an issue of $45,000,000.

Louisville & Nashville

The Louisville & Nashville applied to the commission in August for authority to issue $53,000,000 of stock as a stock dividend and also to issue some bonds. On December 17 the commission issued an order authorizing the bond issue but consideration of the stock issue was held in abeyance.

Three applications requesting authority to issue shares of capital stock without nominal or par value have been filed with the Commission. One of them, filed by the El Paso & Southwestern Company, involved the exchange of stock without par value for stock having a par value; authority upon this application was granted. The other two applications involved the issue of stock without par value under reorganization plans for railroads previously in receivership. Authority upon one of these, filed by the Denver & Rio Grande Western Railroad Company, was granted.

Bonds Sold Subject to Commission's Approval

In the discussions of the subject of security regulation before the law was passed railroad men have laid much stress upon the importance of being able to act promptly to take advantage of a favorable market in placing securities and upon the serious effect of the delay required by the necessity for obtaining governmental approval. In numerous cases, however, during the past year, they have got around this difficulty by making arrangements for the sale of bonds in advance, subject to the commission's approval. In many cases large bond issues have been advertised in the newspapers before the formal applications were filed with the commission and several weeks in advance of the issuance of the order of authorization. Undoubtedly in such cases the financial officers of the roads have been confident that their plans contained no objectionable features and in some cases they may have consulted informally with members of the commission's organization in advance, because the commission in administering the provisions of the law relating to security issues has adopted a policy of working in more close co-operation with the carriers than has been the usual practice in rate cases.

However, the commission took occasion to issue a warning in the first case of this kind that came to its attention that "while the law does not prohibit such a conditional sale in advance of an approval of an issue of securities, carriers should realize that we shall not be controlled in our action by representations that failure to accord approval of issues conditionally sold will result in disturbance or disarrangements of plans based upon anticipated approval."

The first application involving a large security issue to come to the commission was that of the New York Central for authority to issue $25,000,000 of 7 per cent collateral trust bonds, and also $25,000,000 of refunding and improvement mortgage bonds to be pledged as part of the security. The application was dated August 19, the day before the bonds had been conditionally sold, but it was not made public at the commission's office until the next day following the sale. The commission's decision was issued on September 13, containing the warning above quoted.

Some States Object to Commission's Jurisdiction

The New York Central case served to bring forward the question of state rights. The railroad, in filing its application with the federal commission, had ignored the state commissions and the Michigan Public Utilities Commission protested, denying the power of the Interstate Commerce Commission to supplant the state authorities. The commission met this by simply stating in its opinion that "we are of opinion that we have jurisdiction" and this remark has been repeated since in various cases in which state commissions have raised the jurisdiction question.

Publicity

When the Railroad Securities Commission referred to the importance of publicity in connection with security issues, it presumably was thinking particularly of the character of publicity involved in making matters pertaining to security issues a public record and subject to the scrutiny of public officials rather than the kind of publicity that reaches the public through the medium of the press.

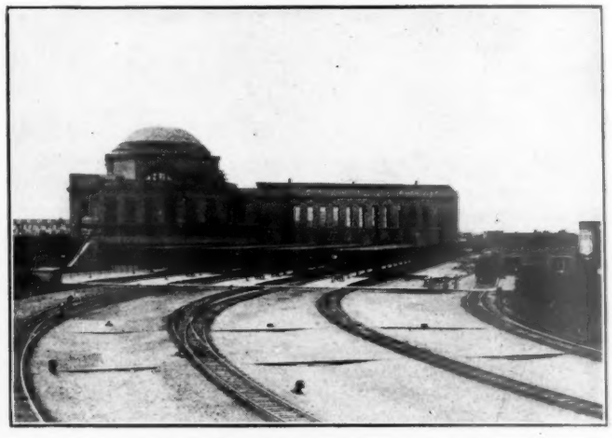
As far as newspaper publicity goes, the public has received very little idea of what has been done either by the railroads or by the commission. Railroad financial scandals have largely faded into history and the public has become somewhat accustomed to large transactions. Therefore the applications to the commission and its orders have been treated as routine and have been very inadequately reported in the daily press. Even the important Burlington and Lackawanna cases were given little attention and the issues upon which the commission decided them required more space to explain than the newspapers were willing to give to the subject.

Probably the general impression that has been created by what publicity has been given the subject has been that the railroads were issuing a very large amount of bonds and that therefore the market conditions must have been favorable for the absorption of railroad securities, because although most of the bonds have been issued for refunding purposes and a large proportion of them for purposes of collateral, the news items have usually made no distinction between those that were to be sold and those which were merely to be exchanged for maturing issues bearing lower interest rates, or to be deposited with the Secretary of the Treasury as security for a loan from the government or with a trustee as collateral for another bond issue.

In many cases, where a railroad proposed to issue a series of bonds bearing a rate of interest at which they could not be marketed under favorable conditions as collateral for an issue bearing a higher rate, the news items have added the two amounts together. For example, when the New York Central applied for authority to issue $25,000,000 of bonds and another $25,000,000 as collateral for the first issue, it was generally reported that the New York Central was going to issue and presumably sell $50,000,000 of bonds. In this way a very exaggerated idea has been conveyed of the extent of railroad financing during the past year.

In many of the applications the railroads have explained the arrangements made in advance for the sale of securities and the commission's order in stating the conditions on which authority is granted has usually referred to the price named as a minimum. In many cases the application explains that no arrangements have yet been made and none will be made until the commission has issued its decision.

The commission has scrutinized very closely the rate of interest proposed to be paid in connection with bond issues and has made many efforts to hold down the rate. In making loans from the revolving fund it has attempted to prevent the payment or the execution of what it considered an unduly high rate by making a condition that the company should meet a certain proportion of its requirements by private financing and often has prescribed a maximum rate of interest. In other cases where it has appeared that the best rate which the railroad was able to obtain was above what the commission considered reasonable, it has met the situation by allowing the road a loan from the revolving fund at 6 per cent and the application to issue guaranties has been withdrawn.



The R. F. & P.'s Richmond Terminal

Opening Session of the Labor Board's Investigation of Threatened Strike of Train Service Employees, G. A. Cook, Secretary of the Board's Bureau No. 3. (Standing Behind the Board), Is Reading the Call to the Meeting. Railway Executives and Brotherhood Leaders Are Grouped on the Left.

Progress Towards Normalcy In Railway Labor Field

Year 1921 One of Many Controversies Between Railways and Employees, But Situation Has Been Improved

By Holcombe Parkes

SLOW BUT SUBSTANTIAL progress toward normalcy in the railroad labor situation can be recorded for the past year. Contributions to post-war readjustment have been made both by the railroads and by railroad employees. The railroads have made some progress in their fight to bring about lower labor costs but in many respects they have lost their fight for principles. The employees have lost in actual wages and many working conditions which they valued, but they have won recognition of principles for which they contended. Both sides express dissatisfaction as a result.

This outcome is largely the result of the existence of a regulatory body, the Railroad Labor Board, the three public members of which, in whose hands is the balance of power, are flanked by six partisan members whose opposing influences tend to cause compromise decisions. It may be, however, that the very slowness of the progress which has been made will be recognized some day as having helped the nation to pass safely through a precarious reconstruction period. At any rate, real progress has been made and the serious industrial strife which many predicted has been avoided.

Three outstanding developments of major significance marked the past year. They were:

(1) The controversy over national agreements and the settlement of a large part of this dispute.

(2) The reduction of labor costs through wage reductions, the elimination of employees and the curtailment of overtime of the forces remaining on duty.

(3) The threat of a general strike of the train service employees, which was averted by a strong public sentiment and the activities of the Labor Board and other government officials.

To appraise properly the labor developments of the last 12 months it is necessary to keep in mind that the year opened with widespread bankruptcy apparently threatening the railroads as the result of a maladjustment between revenues and expenses. In a period of less than four months the traffic of the railroads had fallen from the heaviest ever recorded to the lightest in some years. Earnings had declined correspondingly, and the higher freight and passenger rates, placed in effect August 26, 1920, had failed by ever increasing amounts to produce the net return fixed by Congress and the Interstate Commerce Commission as just and necessary.

THE PAST YEAR witnessed a continual struggle between railroads and labor leaders over national agreements and the readjustment of labor costs.

Slow but substantial progress has been made, however, in improving the labor situation.

The year 1922 will see a further struggle to reduce labor costs.

Labor Board Begins Consideration of National Agreements

When the Labor Board handed down its wage increase award in July, 1920, it continued the national agreements in effect pending further hearings. These hearings began on January 10, 1921, when E. T. Whiter, chairman of the Conference Committee of Managers of the Association of Railway Executives, and B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, fired the opening guns in a four months' pitched battle. For 19 days Mr. Whiter attacked the rules in the various national agreements, showing in detail the inefficiency and waste caused by the universal application of rules regardless of widely varying local conditions.

Mr. Jewell retaliated at intervals by "statements" aimed, not at the rules under discussion or at the board, but at the public in an attempt to influence public opinion, and divert attention from the real issues. Charges that the railroads were mismanaged, that they had broken faith with the public, violated the Transportation Act and defrauded the public out of millions of dollars were spread broadcast by Mr. Jewell.

Meantime the financial condition of the carriers became more precarious. The seriousness of the situation brought General W. W. Atterbury, vice-president of the Pennsylvania and chairman of the labor committee of the Association of Railway Executives, before the board on January 31 with requests for immediate abrogation of all national agreements, a return to the rules and working conditions of December 31, 1917, and the right to pay unskilled labor prevailing local rates. Assurances that the carriers would refrain from asking for wage revisions for 90 days if these requests were granted were made. A bitter battle of "statements" to the public and the board and telegrams to President Wilson ensued. The President declined to interfere, but the public was awakened to the seriousness of the situation.

Mr. Jewell, reinforced by Frank P. Walsh, counsel, W. Jett Lauck, "consulting economist," and a battery of publicity men, reopened the battle on February 10 after widely advertising that he intended to sidestep the national agreements issue temporarily to bring charges of a "huge conspiracy" on the part of Wall street banking interests and railway executives to "crush organized labor." The board, realizing that such testimony was irrelevent, ruled it out. At the same time the board denied General Atterbury's requests. The decks were cleared for consideration of the real issues involved.

Employees' Spokesmen Delay Hearings

The testimony on behalf of the carriers was completed on February 3. The opportunity to delay the hearings, thus continuing the national agreements in effect, was not overlooked by the labor leaders. Petitions for additional time in which to prepare replies to the carriers' testimony, offers of "settlements" involving the recognition of the principle of collective bargaining as defined by the labor leaders—bargaining solely on a national basis—and requests for the subpœnaing of officers of the Association of Railway Executives and railway executives who were members of the labor committee of that organization were utilized by Messrs. Jewell and Walsh to postpone the hearings.

Some of the petitions for delays were granted by the board. The insistent demand for the calling of railway executives as witnesses finally resulted in their being asked to appear on March 18. With the exception of seven days in which representatives of several of the smaller organizations presented testimony in favor of the continuation of their national agreements, the period from February 3 to March 18 represented the results of Mr. Jewell's efforts to prolong the life of these pacts.

Five days of cross examination of railway executives at that time and five days of the same thing later, from April 4 to 8, but caused the railways to set forth with greater force that the universal application of rules regarding working conditions is impossible without a loss of economy and efficiency. Likewise attempts to bring out evidence in support of the "huge conspiracy" charges fell flat.

Mr. Jewell Presents Labor's "Bill of Rights"

Mr. Jewell presented a significant "bill of rights," outlining the 11 basic principles for which the employees were fighting. These principles, "the irreducible minimum in labor's bill of rights," included the eight-hour day, punitive overtime, and rules dealing with: (1) the arrangement of the beginning and ending of working shifts "so as to permit of reasonable living arrangements," (2) the safety of employees, (3) the definition of the work to be performed by each craft, (4) apprentices, (5) the requirements for employment, (6) the right of the majority of the employees of any craft to elect an organization to represent them, (7) the right of the majority to elect committees to handle grievances for all employees of the craft, (8) seniority, and (9) the right to organize and the protection of employees against discrimination.

On March 24, almost eight weeks after the carriers had closed their case, Mr. Jewell began his real reply. After another delay for the cross examination of more executives, interest in the national agreements controversy gradually dwindled. The hearings, however, did serve as an agency through which voluminous exhibits prepared by Mr. Lauck could be given wide circulation bearing the stamp of authentic testimony before a government body. Sometimes these exhibits dealt with national agreements. For the most part they consisted of alleged evidence of the "conspiracy" and mismanagement charges and loose allegations made by representatives of the employees.

Labor Board Abrogates, Then Continues, National Agreements

The first of a series of decisions in this dispute was handed down by the Board on April 14. It abrogated national agreements on July 1, remanded the negotiation of new agreements to the individual carriers and their own employees and upheld the railroad's interpretation of collective bargaining and their contention that varying local conditions should govern in fixing rules and working conditions. It also outlined 16 principles with which the new agreements should be consistent, thus awarding the employees one of the major points for which they had been contending.

The subsequent negotiations between the individual railways and their own employees were almost fruitless, mainly because the leaders of the national labor unions instructed their followers to accept nothing less than the rules in the national agreements. On June 28, therefore, the Board issued an order continuing all national agreements until such time as the board could pass on the rules and ending until further notice time-and-one-half for overtime.

Overtime and Piecework Disputes Decided by Board

The Board handed down the first of its final decisions in the controversy over the shopmen's agreement on August 11, almost six months later. Seven new rules, recognizing and continuing the principle of punitive pay for overtime work, were promulgated. The new rules sanctioned the principle of the eight-hour day, the policy of paying time-and-one-half for work performed on Sundays and holidays, except that which is absolutely essential to continuous operation, and the practice of paying an allowance to an employee called but not required to work. On the other hand, the new rules so changed the overtime provisions of the shop crafts' national agreement as to eliminate many wasteful and ridiculous effects brought to the attention of the Board.

Drafts of 17 more rules for inclusion in the new agreements with the shopmen were announced on October 13. One of these rules removed the ban on piece-work and of the total of 17 rules, 10 were so worded as to obviate inefficiency and waste caused by the application of rules in the national agreement and seven were exact counterparts of rules of the national agreement.

Labor Board Announces New "National Agreement"

The Board handed down its final ruling, insofar as the shop crafts' agreement is concerned, in the form of a complete new set of rules on November 29. These new rules applied wherever disagreements had arisen over the points covered by any particular rule of the national agreement. In

other words, a new "national agreement" for the shops crafts was promulgated. Instead of having the rules incorporated in one agreement applicable to all carriers and shop employees, identical rules will, in the future, be incorporated in all the agreements between the carriers and their shopmen. The effect will be that against which the carriers have principally directed their whole fight—the universal application of rules regardless of varying local conditions. To this extent this final decision represents defeat for the railroads.

On the other hand, the revised rules will relieve the railroads of much of the waste caused by similar rules of the national agreement. These new rules made by the Board do not apply where agreements on rules regarding the same matters have been reached by the individual carriers and their shopmen. It is likely, however, that as opportunities present themselves either the employees or the carriers will ask for the establishment of the rules that are the most favorable to themselves. If disagreements ensue and cases come before the Labor Board, it is logical to assume that the Board, having already determined what it considers a just and reasonable rule upon the point in question, will simply order the application of its own rule. Thus, so long as the Labor Board regulates the working conditions of any class of employees, there will be a strong tendency for the working conditions of that class of employees to be made uniform throughout the country.

Financial Situation Forces Roads to Cut Forces, Overtime and Finally Wages

The extremely serious situation in which the carriers found themselves at the beginning of the year, together with the refusal of the Labor Board to grant immediate relief by authorizing the changes suggested by General Atterbury, forced the railways to ask reductions in the wages of all employees. The laying off of 655,000 employees between August, 1920, and April, 1921, and cutting the working time and the overtime of the employees remaining in service so that the average earnings dropped from $162.25 a month in the third quarter of 1920 to $149 a month in the second quarter of 1921, despite the fact that the wage rates in these two quarters were exactly the same, failed to solve the problem. So in March, while the national agreements controversy was still holding the spotlight, each railway, acting in accordance with a general policy of decentralization, brought disputes over proposed wage reductions to the Board.

The carriers' testimony was based entirely on (1) the decline in the cost of living and (2) the wage reductions in other industries. The employees replied with amplifications of the old charges of mismanagement, etc., their only relevant defense being predicated upon (1) the fact that there had been no decrease in the wages of workers in the coal and steel industries and (2) a denial that the decrease in the cost of living justified wage reductions. The Board's decision, announced on June 1, provided for a wage cut on July 1 averaging about 12 per cent. The average reduction represented almost exactly the halving of the opposing demands of the carriers and the employees.

Labor Leaders Try to Use Wage Cut to Ward Off Further Readjustments

The labor leaders immediately made preparations to use this moderate reduction as a means of warding off further readjustments of labor costs. United action by the various unions was desired, but factional differences made this impossible. The train service organizations finally agreed upon a plan of action which involved a referendum vote, and the association of the wage cut issue with protests against further wage reductions and the proposed abolition of punitive overtime. Subsequently, representatives of the brotherhoods asked the carriers to (1) wipe out the wage cut of July 1, (2) withdraw all demands for further wage reductions and (3) withdraw all demands for the abolition of punitive overtime for a stated period. The demands were rejected by the carriers and the question of a strike was submitted to the men. Meantime, the other organizations had been taking strike votes against the wage cut, and talk of a general strike began to be widespread.

Brotherhoods Call Strike for October 30

The controversy came to a head on October 14. The union leaders had already completed the count of their strike ballots and found a large majority in favor of a walkout. A meeting of the Association of Railway Executives was being held in Chicago and the heads of the train service brotherhoods sought a conference and received a final rejection of their demands. At the same time the railway executives announced that further wage reductions were to be sought immediately as a means of meeting the insistent demand for reduced rates. As a result of this combination of circumstances the leaders of the train service organizations called a strike for October 30 to become effective on groups of carriers on succeeding days.

The heads of the other railway labor organizations meanwhile had had little to say. It developed later that the so-called "associated standard recognized railroad labor organizations" had broken into two groups, the train service organizations comprising one and the remaining unions the other. The cause of the break, which was expected for some time, was given as the inability of the two groups to agree upon the terms on which the impending strike would be terminated.

Labor Board as a Peace Maker

Here the Labor Board, gathering courage from the attitude of the government and the President, made its first energetic attempt to bring peace. The leaders of the brotherhoods were called into conference by it, but the meeting was a complete failure. The Board, realizing its existence probably depended upon averting the threatened tieup, immediately arranged for an investigation of the whole situation and called the chiefs, executive committees and general chairmen of the train service organizations and the chief executives of practically all of the larger railways together in Chicago. This investigation was the dramatic event of the year. B. W. Hooper, vice-chairman of the Board, developed the fact clearly through examination of the labor leaders, that the strike was called, technically as a protest against the wage reduction, but in reality as a "bluff" to ward off further wage reductions and changes in the working rules of the men involved. Nevertheless the brotherhood leaders stoutly maintained that nothing could stop the strike but a "satisfactory settlement."

Just previous to this investigation the Board had issued a memorandum in which it stated among other things, that further requests for reductions in wages of any class of employees would not be considered until all pending disputes regarding the rules and working conditions of that class were disposed of. This memorandum, however, was not presented to the brotherhood chiefs until later, when Mr. Hooper read and explained its provisions before a meeting of brotherhood leaders. The provisions of this memorandum, together with Mr. Hooper's explanation of its intent, constituted a "satisfactory settlement." The strike was called off on October 27. There followed a period of comparative calm.

Labor Board Fails to Bring "Peace"

In creating the Labor Board, Congress obviously had in mind the establishment of machinery which would make for peace between the carriers and their organized employees. Throughout the year, however, there has been constant dissension and several small strikes culminating in the threat

of a general strike. Real peace was not achieved, but at the same time nation-wide strikes were avoided.

The Atlanta, Birmingham & Atlantic Case

At the same time General Atterbury went before the Board with his request for immediate relief, there developed a situation on two small roads which later resulted in serious strikes. The Atlanta, Birmingham & Atlantic was losing $100,000 a month and its financial position, therefore, became so precarious that it finally ordered wage reductions for February 1, and later petitioned the Board to sanction the cuts. After hearing the case on January 25, the Board ordered the carrier to rescind its wage reduction order and later, on February 21, ordered the dispute remanded to further negotiation, in accordance with the terms of the Transportation Act. On March 5, about 1,500 employees of the A., B. & A. went out on an "unauthorized" strike which completely tied up the road for some time. In the meantime, however, a receiver for the road had been appointed by the United States District Court and the wage reduction orders were re-issued to become effective on March 26. This raised an interesting issue as to superior jurisdiction as between the District Court and the Labor Board. The Board called representatives of the A., B. & A. before it on March 21, to determine whether or not the carrier, in reducing wages in accordance with a court order, had violated the Board's previous wage rulings.

The action of the carrier in reducing wages in compliance with the ruling of the District Court was adjudged a violation of the Transportation Act by the Labor Board in a ruling handed down on April 21. This ruling at the same time avoided demanding the recall of the wage cut order and suggested further conferences between the management and the employees. The controversy between the court and the Labor Board was never definitely decided, but the fact remains that the dispute resulted in a strike which was for some time a source of much trouble and inconvenience in the territory served by this road.

The Missouri & North Arkansas Controversy

Another case very similar to this and resulting in an even more serious situation first came before the Board on February 15, as a result of a wage reduction put into effect on February 1, on the Missouri & North Arkansas by order of the receiver of that road. Before the case came before the Board, the employees involved went on strike and their places were taken by new employees as rapidly as they could be obtained. At hearings before the Labor Board on February 15, this dispute was also remanded to negotiations in accordance with the terms of the Transportation Act. However, the Board's order also directed the employees to accept the reduced wages under protest because of "extenuating circumstances." Strenuous efforts were made to maintain service, but the belligerency of the strikers finally resulted in tying up the entire road. An attempt was made to resume operation, beginning on March 24, after repairs to the property had been made, but by July it became evident that further attempts to operate under the conditions were useless and on July 31, the road discontinued operation.

A strike occurred on the International & Great Northern immediately prior to the threatened strike of train service employees in October. The trainmen on this carrier walked out despite orders of the Labor Board although the interruption to traffic was not serious and the men returned to work "on probation" after the threatened general strike was called off.

Controversy Between Labor Board and Pennsylvania

There is one other significant dispute which should be briefly included in a review of the failure of the labor provisions of the Transportation Act to bring "peace," namely the dispute between the Board and the Pennsylvania. When the Labor Board remanded the dispute over national agreements to negotiation between individual carriers and their own employees, the Pennsylvania immediately set out to determine who the majority of its employees desired to have represent them. It sought this information by means of a secret ballot, providing for the election of employees of the company and not organizations or men who were not in the employ of the company at the time. As a result of these elections, committees were appointed and negotiations conducted resulting in the formation of a new set of rules governing the working conditions of shopmen at the Altoona shops and later at other points.

The protests of the system organization of the Federated Shop Crafts brought the Pennsylvania before the Board on July 14 and 15, when it defended the elections and the subsequent negotiations, on the grounds that (1) the board exceeded its authority in extending the national agreements, (2) the rulings of the Board on this controversy will have the effect of perpetuating the national agreement, thus providing for the "closed shop," and (3) the Pennsylvania has carried out its understanding of the Board's purpose in remanding the dispute over national agreements.

The employee's arguments were based largely on the request for a ruling on (1) the right of the majority to determine what organization shall represent them, (2) the right of the organization to negotiate for all employees of a craft, through representatives of their own choosing, regardless of whether these representatives are employees of the carrier or not, and (3) the right of the organization to elect representatives in accord with its own laws. These three points, they claimed, were settled in favor of the unions by the 16 principles which the Labor Board said should govern in the negotiation of new agreements and were violated by the Pennsylvania in this case.

On August 1, the Labor Board ordered a new election on the Pennsylvania, finding both the carrier and the employees guilty of "illegal and unfair" actions. The Pennsylvania replied on August 24 by asserting that the new agreements already made were in full force and asking the Board to vacate its ruling calling for a new election. The Labor Board in turn defended its position in the case in a lengthy order, calling for further hearings. When these further hearings were scheduled, September 26, the Pennsylvania declined to appear before the Board because of restrictions on the testimony to be presented which automatically prohibited the Pennsylvania from clearly outlining its position.

However, on October 20, the Pennsylvania again came before the Board and outlined its previous stand. No further developments came, however, until December 9, when the Pennsylvania obtained a temporary injunction from the Federal Court at Chicago, restraining the Labor Board from publishing a decision which it had promulgated as a result of this controversy. Hearings on the carrier's plea to make this injunction permanent were subsequently set for December 26, leaving another important phase of the railroad labor problem as a legacy for the new year.

Regional Boards of Adjustment Formed

The question of the formation of boards of adjustment, a matter left to agreements between the carriers and their employees by the terms of the Transportation Act, has been partially solved during the past year through the creation of three regional boards on which are represented the four train service organizations and a number of the larger carriers. Immediately after the passage of the Transportation Act the labor organizations stood solidly for national boards of adjustment. However, the train service brotherhoods later receded from this position and suggested regional boards. The first results of this were seen in the establishment of a board of adjustment in September to handle disputes over personal grievances and the interpretation of schedules be-

tween the Baltimore & Ohio and the New York Central and the four train service organizations. This board is composed of eight members; four representing the two railroads and one representing each of the organizations involved. In October a similar board to handle disputes between the train service organizations and eight of the larger western carriers was created. Still another, to handle disputes between the train service organizations and 17 southeastern roads, was created in November. In the southwest, negotiations are still in progress looking to the creation of a board for that territory. The purpose and jurisdiction of all of these boards are substantially the same.

The Pennsylvania and its employees went even further, in the establishment in September of system and regional boards of adjustment for the following groups of its employees: (1) train and engine service; (2) maintenance-of-way and structures; (3) signal department; (4) mechanical helpers and apprentices, maintenance of equipment and telegraph and telephone, eastern region; (5) clerical forces, eastern region; and (6) miscellaneous station forces, eastern region. These boards, or "reviewing committees" as they are called, for the first three groups cover the entire system; for the last three the regions indicated.

Being created, as all of these boards were, during the last four months of the year, they did not materially change the course of events or affect the work of the Labor Board. They will tend, however, to relieve the Board of a number of disputes which that body has had to handle through the sub-division of its members into three bureaus and through examiners, leaving it more time in which to take up and consider more important controversies.

The Outlook for 1922

A year of constant wrangling has brought a decided improvement in the railroad labor situation, but the year 1922 promises to be another year of wrangling and struggle. The year opened with the vital question of national agreements undecided, with readjustments of wage scales in prospect and with the future of the Labor Board dependent upon its accomplishments. The year has passed and the national agreements are still "among those present" although in greatly modified form, a further readjustment of wage scales is imminent and the future of the Labor Board is still undecided.

Three developments of significance brought the year to a close. On December 20 the Labor Board announced its decision in the several controversies resulting from the negotiation between individual carriers and their maintenance-of-way employees of new rules to supersede the national agreement. This decision contains specific rules to be applied in all cases where dispute had arisen on the points covered by these rules. In other words, the form and application of the decision are the same as those of the shop crafts decision. In this case, however, part of the old national agreement was not passed upon, namely the seniority and the promotion clauses, inasmuch as practically all of the carriers and their employees had agreed upon rules to cover these subjects. Other rules in the national agreement were written to eliminate the objectionable features of their counterpart in the national agreement. For instance, the overtime rules were changed so that punitive overtime for all workers in the maintenance-of-way department would start after the tenth hour, instead of the eighth hour as had been the case under provisions of the maintenance-of-way national agreement. In addition, many points covered specifically in the national agreement were expressly left open for local adjustment.

Year Closes With Three Significant Developments

On December 9 another chapter was added to the jurisdictional dispute between the Pennsylvania and the Board, when a temporary injunction restraining the Board from publishing a decision which was believed to be detrimental to the interests of the carrier, was issued by the Federal Court at Chicago, on the plea of representatives of the carrier. Arguments on a plea for a permanent restraining order were first scheduled for the following day, then postponed to December 21, and finally to January 3 of the present year, by mutual agreement.

The third development of significance was a ruling made by the Labor Board in which, for the first time, the "ability of the carrier to pay" was recognized by the Board as an element of "secondary consideration" in the fixing of just and reasonable wage scales. The decision came in a dispute between the New Orleans Great Northern and its train and engine service and maintenance-of-equipment employees, station agents, assistant station agents, and telegraph operators. This decision is interpreted as a recession from its former position in that it not only specifically states that testimony of this character is worthy of "secondary consideration" but it reduced the rates of pay of the employees involved, in compliance with the request of the carrier.

Photo by Keystone

The Bush Terminal, Brooklyn, N. Y.

The Federal Valuation Is Entering New Stages

Tentative Reports Being Served on Carriers—Hearings on Protests Scheduled—Forces Reduced

By E .T. Howson

THE MOST IMPORTANT development in the work of valuing the properties of the railways during the year which has just closed has been the completion and serving on the roads by the Interstate Commerce Commission of a large number of tentative valuations, with figures for the first time of the Commission's estimate of tentative "final value." While 55 tentative valuations were served on the roads last year, they did not contain any figure purporting to show this "final value." The decision of the United States Supreme Court in the mandamus action brought by the Kansas City Southern, handed down on March 8, 1920, made it necessary for the Commission to prepare supplemental valuations, the first of which were not served until April 5 of this year. Since that time others have been issued at frequent intervals, with the result that a total of 177 tentative valuations have now been issued on roads with an aggregate of over 26,000 miles of line, or slightly over 10 per cent of the mileage of the country.

REPORTS containing tentative "final value" were served on 177 carriers during the years. Carriers' book records of investment in road and equipment are being sustained as more valuations are being reported. Valuation work suffered severe loss in death of C. A. Prouty, director of the division since its organization.

All district offices were closed and forces were cut in half late in the year. Future of the work is being regarded with increasing uncertainty.

The valuation work received a severe blow in the death of C. A. Prouty on July 8. Mr. Prouty had been director of the Division of Valuation since its organization. In his passing the valuation work has lost more than its official head. Mr. Prouty had been a leading member of the Interstate Commerce Commission for 18 years and was its chairman for one year, prior to his connection with the valuation of the railways. As a commissioner he had gained the confidence of the carriers and the public to a degree enjoyed by few in similar positions. In that capacity he had long advocated the making of a valuation for use in regulating the railways and, following the passage of the Valuation Act in 1913, he resigned from the Commission to organize and direct this newly created activity. In this capacity his sense of fairness and the confidence which he inspired did much to launch this work successfully in its early days when there were so many possible points of controversy between the Division of Valuation and the carriers on the one hand, and the state commissions on the other hand.

Another development which came unexpectedly late in 1921, was the closing of the five district offices of the Bureau of Valuation and the concentration of all work in Washington. Incident to this move, the forces were cut practically in half, the cut being especially drastic among the higher officers in these district offices, the large majority of whom severed their connection with the work. This consolidation of offices and reduction in forces was brought about by the program of retrenchment instituted by the administration. It has resulted in considerable temporary disorganization which is necessarily incident to a transfer of forces of this magnitude, but will probably not delay the ultimate date of completion of the work.

The valuation work is divided into three major groups, the engineering, the land, and the accounting departments.

Shortly after the inauguration of this work in 1914, Director Prouty estimated that the inventory work of all of the railways of the United States would be completed as of the average date of January 1, 1920. While the war interfered somewhat with that schedule, it was finished and the field parties disbanded during 1920 in all of the districts except the eastern where, because of the greater complications, this work was not finished until early in June. Since that time the engineering department has concentrated its attention on the completion of the engineering reports and on June 30, 1921, reports covering 111,682 miles, representing the properties of some 425 carriers, had been submitted to the director of the division. A total of 244 engineering reports had been tendered to the roads informally prior to November 30, 1921, in addition to those incorporated in the tentative valuations which had been served on the carriers by the Commission.

Present Status of the Work

The work of the land department has lagged somewhat behind that of the engineering section. Additional duties were also thrown upon this branch by the Kansas City Southern decision, which required the Commission to ascertain and report "the present cost of condemnation and damages or of purchase in excess of present value" of common carrier lands. However, this department is now making greater progress and the field work is practically complete, except for terminals in all except the eastern districts, where owing to the extreme density of the larger lines, work will continue for some time. The field forces in the land department were reduced to 25 per cent of their former personnel on July 1. Up to November 30 of this year, 199 land reports had been tendered to the railroads in addition to those included in the tentative valuations.

The work of the accounting department has progressed less rapidly. This branch was greatly handicapped by the impossibility of retaining adequate efficient forces during the war, resulting in a high turn-over and an almost constant shortage of employees. However, the increased salaries which were put into effect in 1920 and the change in employment conditions throughout the country, have resulted in alleviating this condition so that better progress is now being made, and it is expected that the field work will all be completed shortly after the first of the year and the field forces disbanded. On November 30, 1921, 109 accounting reports had been tendered to the carriers, beyond those incorporated in the tentative valuations which have been served to date.

The progress which has been made during the past year can best be stated in the words of the Commission itself, as contained in its annual report for the year ending October 31, 1921, as follows:

"Prior to November 1, 1920, 55 tentative valuation reports, representing the properties of 70 carriers, had been issued. The decision of the Supreme Court of the United States handed down March 8, 1920, required the Commission to investigate and report 'the present cost of condemnation and damages, or of purchase, in excess of present value' of common carrier lands. Having determined the excess cost of acquisition figures for the properties covered by the 55 tentative valuation reports, a supplemental tentative valuation has been issued and served, in each case, showing excess cost of acquisition of the lands and final value figures.

"In addition to the above mentioned, 96 tentative valuation reports upon the properties of 123 carriers have been completed and served on interested parties during this period, bringing to 193 the number of properties upon which tentative valuations have been issued to October 31, 1921. Every energy is now being directed to the work of completing tentative valuation reports.

"The work of the bureau of valuation divides itself, in all sections, into two broad classifications, field and office. In the engineering section, which required a larger and more expensive organization than either the land or accounting sections, all field work has been completed and the parties have been disbanded. In the accounting section approximately 98 per cent of the field work has been completed and the balance will be finished in the current year. The work yet remaining to be done is largely on carriers of less than 500 miles, that is, below the importance of major properties. In the land section, on a basis of mileage, the field work is 98 per cent completed and the personnel reduced to about one-fifth of its quota at the beginning of the year. The force developed by the land section to comply with the Supreme Court decision above referred to, has covered a large part of the studies upon which its findings are based. It has completed reports on all properties upon which tentative valuations had already been issued and is keeping abreast of the other sections in covering current reports.

"The completion of the field inventory will mark an important step in the progress of the valuation work. There will then follow the analytical work of assembling the data accumulated through the inventory and compiling therefrom the underlying reports which form the bases for the tentative valuations, 193 of which have been issued as before stated. There will remain the work of hearing the carriers on their protests against the tentative valuations, which may result in modifications of the tentative valuations, and after this the publishing in final form of our reports on the properties of the individual carriers."

Since the termination of the year covered by this report, namely, October 31, 1921, 24 additional reports have been issued on 27 properties up to December 9, making a total of 177 reports on 220 properties which have been issued to that date.

The largest road on which a report fixing a tentative final value has yet been issued is the Chicago, Rock Island & Pacific which, with its subsidiaries which were also reported on, included 7,685 miles of line. Other large roads on which reports have been issued during the past year include the Atlanta, Birmingham & Atlantic; the Kansas City Southern; the Elgin, Joliet & Eastern; the Los Angeles & Salt Lake; the Norfolk Southern; the Central of Georgia; the Western Pacific; the St. Louis Southwestern; the Mobile & Ohio; the Florida East Coast and the Monon.

The roads are filing their protests on these valuations as fast as they can be prepared. The Commission has announced the first of the hearings on these protests on January 6, when the Los Angeles & Salt Lake will come before it; the Elgin, Joliet & Eastern and the Atlanta, Birmingham & Atlantic are scheduled to appear on January 9, the Evansville & Indianapolis on January 16, and the Central of Georgia and the Florida East Coast on January 23. Following the hearings on these and other protests, the Commission will revise or sustain its tentative valuations and issue them in final form. When this is done, the conclusion appears to be gaining ground that the roads have no recourse until this valuation is used, when, if not satisfactory, they can attack it in the courts. It would appear that the use of the figure of "final value" as a basis for the fixing of the rate of return and the division of earnings as provided for in the Transportation Act would constitute such a use.

As these valuations have been served on the roads, they have been scanned intently to ascertain wherein they have differed from the contentions of the carriers. In general there have been less discrepancies in quantities than might have been expected originally. It is to be expected that there would be wide disagreement as to many of the prices, but there has probably been less dissatisfaction as a whole than might be expected on so vital a point, the principal cause for complaint being the use of 1914 prices throughout.

The roads are, however, making strong objection to the failure of the Commission to include allowances for contingencies, for costs of preliminary and location surveys, for the removal of buildings or other structures from the right-of-way, and for trestles and other temporary construction actually used but not considered essential for new construction, assessments for public improvements, appreciation, going value, etc. There has also been considerable criticism regarding the period of construction which has been assumed for the computation of the allowance of interest during construction. Likewise, no allowance has been made for the excess cost of carrier lands over the acreage price of adjoining lands.

What the Valuations Show

The principal interest in the valuation results centers, of course, in the relation which these results bear to the capitalization of the corresponding properties. Unfortunately it is not possible to make any accurate comparison of the valuations which have been issued to date with the capitalization of the corresponding properties because of the difficulty of eliminating duplications in capitalization. The valuation placed on the "total owned" properties of the 77 carriers reported on to date aggregates $1,091,986,543, while the corresponding records of the carriers' investment in road and equipment aggregates $1,445,758,800. These are 1914, 1915 and 1916 figures which include the Atlanta, Birmingham & Atlantic, the Kansas City Southern, the Western Pacific and the Los Angeles & Salt Lake properties; the difference between whose valuations and book records accounts for over $213,000,000 of this discrepancy. In making any comparison at this time, it should also be borne in mind that the first roads for which the government undertook its valuation work were either small lines selected for the purpose of testing out proper methods or were roads that were in the hands of the receivers or had been subject to reorganization. They have in general been the weak roads or those which will afford the least favorable comparison.

Furthermore it should be borne in mind that these comparisons are as of the date of valuation, which in the case of most of the larger roads reported on to date is June 30, 1914 or 1915. Since that time a number of these roads, such as the Western Pacific, the Atlanta, Birmingham & Atlantic and the Chicago, Rock Island & Pacific, have been reorganized and their capitalization reduced.

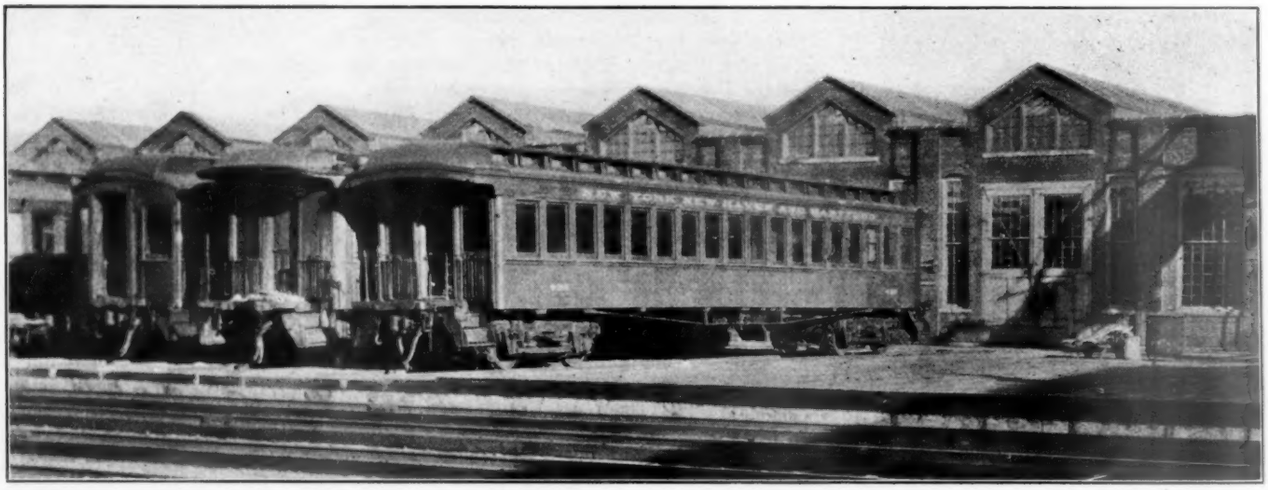
Insofar as the carriers' records of road and equipment are concerned, it is also instructive to note that the Commission has examined the records of carriers with a book record of investment aggregating $3,649,181,721 and has certified to the correctness of $3,401,670,282 or 92.7 per cent of this amount. Furthermore, a large part of the deduction is for excess of securities and discounts in the sale of these securities, the exclusion of which is at least debatable.

It is therefore becoming increasingly evident that the railways have little to fear from the valuation. As reports are made upon the stronger and more conservatively financed roads, it is evident that the values of the properties found by the Commission will equal and in many cases exceed their capitalization by a considerable margin.

Future of Valuation

As the year came to a close it has become apparent that there is increasing uncertainty regarding the ultimate completion of the valuation work. This feeling is attributable to numerous influences. The failure of the Commission to appoint a successor to Director Prouty, although the vacancy has now existed for six months, indicates a lack of decision on its part. In the meantime various candidates, both within and without the Division of Valuation, have been offered more or less aggressively by their friends, which has not added to the efficiency of the organization. The drastic cut in forces during the fall as a measure of retrenchment in the enforcement of the Dawes program has added to this feeling of uncertainty.

More pronounced, however, is the fact that this work is rapidly losing its supporters in Congress, if indeed it has not already lost them. When the Valuation Act was passed in 1913, it was sponsored by those legislators who had been hostile to the railroads and who hoped by this measure to bolster up their claims that the roads were grossly over-capitalized. Now that sufficient valuations have been issued to prove the fallacy of this contention, they are no longer interested in it and some in fact are now believed to be opposed to it. This lack of support accounts even more than the nominal reduction in forces incident to the completion of certain portions of the work, for the reduction in the appropriation for the year ending June 30, 1923. This appropriation, which has just been recommended to Congress by President Harding, has been cut to $1,500,000 or only slightly more than half of the appropriation of $2,750,000 for the fiscal year which ended on June 30, 1921. As a matter of fact, the pressure for the completion of this valuation work is now coming from the railroads rather than from the regulatory bodies.



Union Station, Senate Offices, Capitol, Congressional Library and House Offices, Washington, D. C.—Photo by Ewing Galloway

Status of Railroad Accounts With the Government

Large Amounts Still Due Carriers While Latter Owe for Additions and Betterments and Loans

By Harold F. Lane

ALTHOUGH it is now nearly two years since the railroads were relinquished from federal control, much remains yet to be done in the way of settling the accounts between the companies and the government covering the 26 months of federal operation and the six months' period following it, during which the guaranteed compensation was continued to allow time for the necessary readjustment of the rates.

Accounts with the Railroad Administration

Of the 241,194 miles of road that were taken over by the government, roads operating 107,063 miles have effected final settlements with the Railroad Administration, and according to the latest estimate made by the Railroad Administration (as of December 1) it still owes the remaining roads $750,670,588 on account of compensation money taken over, maintenance, materials and supplies, depreciation and all other accounts, exclusive of additions and betterments. On the other hand the roads also owe the Railroad Administration a balance of $507,628,508 as yet unadjusted on account of additions and betterments chargeable to capital account made by the government while it was operating the properties. This does not mean that all of the rest of the $1,144,000,000 of additions and betterments has been actually paid for but it has been taken care of in some way, part having been paid in cash, part by 15-year equipment trust certificates and part funded by giving the Railroad Administration negotiable promissory notes.

If the unadjusted indebtedness of the roads on capital account be offset against the indebtedness of the Railroad Administration to them on open account, according to the estimate of the director general of railroads, it still owes the roads $243,042,080. This estimate is made on the assumption that the remaining settlements will be made on the Railroad Administration's construction of the contracts between it and the roads. The claims of the railroads call for a larger sum.

Roads operating 208,721 miles have filed claims for $940,587,256 in final settlement and on this basis the total claims for all the roads are estimated at about $1,100,000,000. Claims to the amount of $436,145,307, representing 215 roads and 107,063 miles, have been settled for $132,221,839, which means that the carriers still have claims to the amount of approximately $664,000,000 against the Railroad Administration's estimate of $243,000,000. However, the roads are expected to waive a large part of these claims that is based on the so-called "inefficiency of labor" in accordance with an informal understanding reached with the President in July in return for an agreement on his part to fund a part of the indebtedness of the roads.

In the settlements that have been made $179,710,117 of additions and betterments (exclusive of equipment) were

INDEBTEDNESS of Railroad Administration to the railroads is estimated at $750,670,588, while the unadjusted balance due the Railroad Administration for additions and betterments is placed at $507,628,508, making a net balance of $243,042,080.

Claims of 215 companies for $436,145,307 have been settled for $132,221,839.

I.C.C. estimates the six-months guaranty to railroads at $536,000,000, of which $105,000,000 has not yet been paid.

Railroads have received $263,000,000 in loans from revolving fund and have repaid $21,000,000.

charged to the carriers and $33,443,000 was funded, while $42,250,000 had been funded prior to final settlement. All of the $381,000,000 of standard equipment was financed by the roads, while Mr. Hines was still director general of railroads, $311,000,000 of the amount having been taken care of by equipment trust certificates.

Six-Months Guaranty

The Interstate Commerce Commission has also made an estimate as of November 30 that there is still payable to the carriers on account of the six-months guaranty about $105,000,000. Its estimate of the total amount payable under the guaranty is about $536,000,000, of which $264,000,000 has been paid in the form of advances under section 209 of the law, $166,000,000 as partial payments under section 212, and $721,658 in final settlement with five companies. These are the Alabama & Mississippi, Ann Arbor, Electric Short Line, Electric Short Line Terminal Company and Norfolk Southern. The railroads had filed returns showing an aggregate amount due them under the guaranty provisions of the act of $818,400,184 but the amount to be paid has been considerably reduced by differences between the interpretation placed on the provision of the law by the roads and by the commission.

Loan Fund

On the other hand, the roads also owe the government some $240,000,000 on acocunt of loans made from the revolving fund provided for by section 210 of the law on certificates of the Interstate Commerce Commission. As security for the loans and for the indebtedness of the roads to the Railroad Administration which has been funded in one form or another, the government holds over half a billion dollars of railroad securities, while it has sold to the investing public over $135,000,000 of railroad equipment trust certificates. The Treasury, at the end of its fiscal year, according to its annual report to Congress, held railroad securities amounting to $680,438,653. This consisted of obligations acquired by the director general of railroads, including equipment trust certificates to the amount of $311,260,300 and $215,574,603 of obligations of the carriers held as security for loans from the revolving fund. The holdings of railroad securities increased $235,000,000 during the fiscal year, principally on account of the loan fund, but have since been reduced by the sale of equipment trusts.

The total loans authorized by the commission up to November 30, the date of the latest public report of the status of the revolving fund, amounted to $263,407,717, which went to 70 companies. Of this, $21,466,067 has already been repaid. The repayments and accrued interest had added $27,525,000 to the fund, while $40,000,000 of the fund has been tentatively reserved for claims, judgments, etc., against the Railroad Administration arising out of federal control, so that there was an uncertified balance at the date of the report of $24,117,283; tentative approvals and commitments, had been made, however, to the amount of $14,013,500, leaving an unencumbered balance of $10,103,783.

Because of the general depression in business during the year and the resulting decline in the costs of materials and labor, some carriers, considering it sound business discretion to defer expenditures of the proceeds of loans certified to them, requested the commission to cancel its certificates and to consider their applications as withdrawn. Other carriers requested the commission to authorize them to expend a portion of the proceeds of their loans for purposes other than those for which the loans were originally made. The commission has generally approved this policy and has thus been able to extend the benefits of the revolving fund to other carriers more urgently in need of financial help, particularly in respect to maturing indebtedness.

National Railway Service Corporation

The amendment to section 210 effected by section 5 of the sundry civil appropriations act, approved June 5, 1920, authorized the commission to make loans for equipment to or through such organization, car trust or other agency as it might determine upon, approve or organize for the purpose "as most appropriate in the public interest," subject to the provisions of the act. The National Railway Service Corporation, organized under the auspices of the National Association of Owners of Railroad Securities, was approved as an agency for this purpose, and the commission certified to this corporation the following loans for the benefit of carriers named:

Baltimore & Ohio	$5,200,000
New Orleans, Texas & Mexico	926,000
Bangor & Aroostook	53,100
Chicago, Rock Island & Pacific	1,568,540
Minneapolis & St. Louis	386,190
Wheeling & Lake Erie	3,304,000
Total	$11,437,830

As a condition of the certification of these loans the National Railway Service Corporation and the carriers themselves were required to finance from outside sources $18,409,765.

The law providing for the loan fund limits the time within which application for loans may be filed with the commission to two years from February 28, 1920. The commission in its annual report to Congress suggested that this period be extended, pointing out that in prescribing this limitation Congress apparently anticipated that the "transition period" would be of relatively short duration, but that "the progress of readjustment throughout the country has been slower than was generally anticipated." The commission estimated that repayments of principal of loans already made, which by their terms require early or serial repayments, and accretions to the fund from semi-annual interest payments during the two years, would aggregate $93,000,000, making an approximate total of $103,000,000 available for additional loans if the period for filing application should be extended.

A table on the following page shows the loans to the carriers which the Commission has certified from this fund.

The repayments have been: Ann Arbor, $60,000; Atlanta, Birmingham & Atlantic, $20,000; Bangor & Aroostook, $4,000; Carolina, Clinchfield & Ohio, $1,000,000; Chicago, Indianapolis & Louisville, $45,000; Chicago & Western Indiana, $89,000; Great Northern, $15,134,000; Illinois Central, $296,000; Missouri Pacific, $4,362,000; National Railway Service Corporation, $380,368.70; Salt Lake & Utah, $15,700; Waterloo, Cedar Falls & Northern, $60,000.

Railroad Administration Settlements

The Railroad Administration had effected some 20 final settlements with the smaller roads up to the end of 1920, but most of the larger roads had not filed their complete claims and some of them have not yet done so. The settlement of the claims is a complicated process at best, but it was made even more complicated by the controversy between the roads and the Railroad Administration over the claims for undermaintenance into which entered the question of the so-called "inefficiency of labor." While the Railroad Administration admitted some undermaintenance, the railroads claimed that even after materials and hours of labor had been estimated in proper relation to similar expenditures in the pre-war period the "inefficiency of labor," from one cause or another still left a wide difference between actual upkeep and the expenditures made during federal control, while the Railroad Administration took the position that its obligation had been fulfilled if it had expended the proper amount of money.

The Railroad Administration had consistently refused to settle except on its own interpretation of the contract unless

its position were reversed by the highest court. The same question, however, had been put up to the Interstate Commerce Commission by a provision in the law which made the maintenance provision of the standard contract its criterion in determining the amount of maintenance expenditures to be allowed the carriers in computing the six-months guaranty and there were some hopes that a decision on its

LOANS CERTIFIED BY THE COMMISSION TO THE SECRETARY OF THE TREASURY UNDER SECTION 210 OF THE TRANSPORTATION ACT, 1920, AS AMENDED

Name of carrier	Amount certified
Akron, Canton & Youngstown	$212,000
Alabama & Vicksburg	1,394,000
Alabama, Tennessee & Northern	90,000
Ann Arbor	650,000
Aransas Harbor Terminal	50,000
Atlanta, Birmingham & Atlantic	200,000
Baltimore & Ohio	8,200,000
Bangor & Aroostook	253,100
Boston & Maine	14,705,479
Buffalo, Rochester & Pittsburgh	1,000,000
Cambria & Indiana	250,000
Carolina, Clinchfield & Ohio	3,000,000
Central New England	300,000
Central of Georgia	237,900
Central Vermont	65,000
Charles City Western	140,000
Chesapeake & Ohio	9,079,000
Chicago & Western Indiana	8,000,000
Chicago Great Western	2,445,373
Chicago, Indianapolis & Louisville	315,000
Chicago, Milwaukee & St. Paul	35,340,000
Chicago, Rock Island & Pacific	11,430,000
Cumberland & Manchester	375,000
Erie	11,574,450
Evansville, Indianapolis & Terre Haute	400,000
Fernwood, Columbia & Gulf	33,000
Flemingsburg & Northern	7,250
Fort Dodge, Des Moines & Southern	200,000
Fort Smith & Western	156,000
Georgia & Florida	800,000
Great Northern	33,496,000
Greene County	60,000
Gulf, Mobile & Northern	515,000
Hocking Valley	1,665,000
Illinois Central	4,440,000
Indiana Harbor Belt	579,000
Inter-Urban	633,500
International & Great Northern	194,300
Kansas City, Mexico & Orient	2,500,000
Kansas City Terminal	580,000
Lake Erie, Franklin & Clarion	25,000
Long Island	719,000
Louisville & Jeffersonville Bridge & R. R. Co.	162,000
Maine Central	2,373,000
Minneapolis & St. Louis	1,768,190
Missouri, Kansas & Texas of Texas	450,000
Missouri Pacific	10,071,860
New Orleans, Texas & Mexico	1,160,000
New York Central	26,775,000
New York, New Haven & Hartford	17,630,000
Norfolk Southern	311,000
Northern Pacific	6,000,000
Pennsylvania Railroad	12,480,000
Peoria & Pekin Union	1,799,000
Rutland	61,000
Salt Lake & Utah	1,008,000
Seaboard Air Line	8,698,000
Shearwood	29,000
Tampa Northern	100,000
Terminal R. R. Association of St. Louis	896,925
Toledo, St. Louis & Western	692,000
Trans-Mississippi Terminal	1,000,000
Virginia Blue Ridge	106,000
Virginia Southern	38,000
Virginian	2,000,000
Waterloo, Cedar Falls & Northern	1,358,000
Western Maryland	3,422,800
Wheeling & Lake Erie	6,264,000
Wichita Northwestern	381,750
Wilmington, Brunswick & Southern	90,000
Total loans certified	$263,407,717

part in favor of the contention of the carriers would have some effect on the Railroad Administration. The Bureau of Finance of the Interstate Commerce Commission at one time took a position in favor of the roads on this point and it was reported that the commission had tentatively decided in the same way by a vote of 6 to 5 but if this were true it reversed itself before issuing its decision and sustained the contention of the Railroad Administration.

Legislation to Provide Funds for Railroad Administration Fails

Before this, however, the entire question became involved in a series of negotiations between the railroads and the administration, in which the President expressed a willingness to exercise the discretion allowed him by the Transportation Act to fund indebtedness of the railroads, while the railroads agreed to waive their claims based on the inefficiency of labor in their negotiations with the Railroad Administration, in order to hasten complete and final settlements, without surrender of any rights in court in case of a failure to settle.

To fund the carriers' indebtedness, however, would increase the amount that would be needed by the Railroad Administration to make its settlements. The President on July 26 sent a message to Congress urging the passage of a bill to extend the authority of the War Finance Corporation so that it might purchase the railroad securities accepted by the director general. "No added expense, no added investment is required on the part of the government," he said; "there is no added liability, no added tax burden. It is merely the grant of authority necessary to enable a most useful and efficient government agency to use its available funds to purchase securities for which Congress has already authorized the issue, and turn them into the channels of finance ready to float them." The bill was passed by the House on August 22 but it was delayed in the Senate by the opposition of the agricultural bloc and finally, toward the close of the extra session, efforts to put it through were practically abandoned.

On August 6, the Interstate Commerce Commission issued its decision in which it held that differences in the "cost of labor," as those words are used in the upkeep section of the contract, do not include changes in the quality or effectiveness of labor but only changes in wages, and that in fixing the maximum amount to be included in operating expenses for maintenance, under the guaranty, the commission will use as the basic measure the expenditure during an average six months of the test period, adjusted to differences in the cost of labor and materials and in the amount and use of the property.

The cash derived from the sale of equipment trust certificates is made available to the Railroad Administration for payment in final settlements and to that extent obviates the need of an appropriation. It had cash on hand on December 1 to the amount of $152,000,000. Without the authority proposed by the Winslow bill to the War Finance Corporation to purchase railroad securities taken by the government in funding operations, the President is still at liberty to sell them direct if he can, but if market conditions improve so that he can do so on favorable terms it is probable that many of the railroads can market securities with which to settle their indebtedness to the Railroad Administration. A list of the roads and other transportation companies which have made final settlements with the Railroad Administration and the amounts they received is as follows:

Abilene & Southern	$150,000
Akron Union Passenger Depot Company	14,000
Alabama Great Southern	1,530,000
Albany Passenger Terminal	5,679
Alton & Southern	385,000
Ann Arbor	*600,000
Arkansas & Memphis Railway Bridge & Terminal Company	90,000
Asheville & Craggy Mountain	5,500
Atlantic Coast Line	5,500,000
Baltimore Steam Packet Company	820,000
Bangor & Aroostook	575,000
Belt Railway Company of Chicago	140,000
Bennettsville & Cheraw	29,500
Bessemer & Lake Erie	3,050,000
Birmingham & Northwestern	10,000
Boston Terminal Company	95,364
Buffalo, Rochester & Pittsburgh	1,000,000
Bullfrog Goldfield	12,000
Cambria & Indiana	70,000
Carolina & Northeastern	15,000
Carolina & Tennessee	5,000
Carolina, Clinchfield & Ohio	550,000
Charleston Terminal Company	90,000
Chattanooga Station Company	19,623
Chesapeake Steamship Company	62,303
Chicago & Eastern Illinois	3,000,000
Chicago & North Western	6,500,000
Chicago & Western Indiana	450,000
Chicago, Burlington & Quincy	8,000,000
Chicago Junction	380,000
Chicago, Milwaukee & Gary	200,000

Chicago, Milwaukee & St. Paul	*6,250,000
Chicago, New York & Boston Refrigerator Company	375,000
Chicago River & Indiana	45,000
Chicago, St. Paul, Minneapolis & Omaha	1,200,000
Cincinnati, Indianapolis & Western	400,000
Clinton & Oklahoma Western	75,000
Clyde & Mallory Steamship Company	162,224
Cumberland & Pennsylvania	550,000
Danville & Western	200,000
Dayton, Toledo & Chicago	20,000
Deering Southwestern	9,000
Delaware, Lackawanna & Western	5,000,000
Denison & Pacific Suburban	15,000
Denver & Rio Grande	800,000
Denver Union Terminal	12,500
Des Moines Terminal Company	15,500
Des Moines Union	330,000
Detroit & Mackinac	105,000
Duluth & Iron Range	4,866,000
Duluth, Missabe & Northern	8,525,000
Duluth Union Depot & Transfer Company	21,000
Durham Union Station Company	2,191
Eastern Steamship Lines	250,000
Elgin, Joliet & Eastern	3,700,000
El Paso & Southwestern	400,000
El Paso Union Passenger Depot	5,666
Escanaba & Lake Superior	140,000
Fairchild & North Eastern	10,000
Farmer's Grain & Shipping Company	25,000
Fort Dodge, Des Moines & Southern	300,000
Fort Worth Belt	75,000
Fort Worth Union Passenger Station	4,529
Fourche River Valley & Indian Territory	20,600
Galveston Wharf Company	85,000
Goldsboro Union Station Company	167
Great Northern	6,500,000
Green Bay & Western	400,000
Gulf, Florida & Alabama	29,100
Gulf Coast Lines	800,000
Gulf, Mobile & Northern } Meridian & Memphis }	100,000
Gulf Terminal	9,426
Gulf, Texas & Western	40,000
Hartwell	24,500
High Point, Randleman, Asheboro & Southern	25,000
Hudson & Manhattan	750,000
Interstate	60,000
Iowa Transfer	7,200
Jay Street Terminal	290,000
Joliet Union Depot Company	2,307
Kansas City, Mexico & Orient	250,000
Lackawanna & Montrose	4,000
Lake Superior & Ishpeming	140,000
Leavenworth Depot & Railroad Company	10,500
Lehigh & Hudson River	225,000
Lorama	2,350
Los Angeles & Salt Lake	800,000
Louisiana & Arkansas	200,000
Louisiana & Mississippi Railroad Transfer Company	33,232
Louisiana Southern	90,000
Louisville & Wadley	3,175
Lufkin, Hemphill & Gulf	8,700
Macon Terminal	71,363
Manistique & Lake Superior	50,000
Marquette & Bessemer Dock & Navigation Company	60,000
Marsh Refrigerator Service Company	21,000
Merchants & Miners' Transportation Company	600,000
Meridian Terminal Company	702
Middle Tennessee	5,000
Midland Valley	550,000
Minneapolis Eastern	55,000
Minnesota & International	340,000
Mississippi Central	220,000
Missouri & Illinois Bridge & Belt	13,559
Missouri Pacific	9,000,000
Mobile & Ohio	700,000
Munising, Marquette & Southeastern	90,000
Nashville, Chattanooga & St. Louis	700,000
New Mexico Central	31,394
New Orleans Great Northern	190,000
New York, Chicago & St. Louis	3,000,000
New York Connecting	1,395,000
New York Dock	64,861
New York, Ontario & Western	500,000
Northern Pacific	9,000,000
Northwestern Pacific	850,000
Old Dominion Steamship Company	900,000
Ontonagon	11,937
Oregon Electric	90,000
Oregon Trunk	100,000
Pere Marquette	750,000
Philadelphia Belt Line	2,931
Pittsburgh & West Virginia	720,000
Port Bolivar Iron Ore	35,000
Pullman Company	7,250,000
Rapid City, Black Hills & Western	4,000
Richmond Terminal	*17,157
Rio Grande Southern	105,000
Savannah Union Station Company	1
Sharpsville	14,403
Sioux City Bridge Company	98,547
Southern Illinois & Missouri Bridge Company	40,240
Southern	6,000,000
Southern Steamship Company	207,800
Spokane, Portland & Seattle	1,600,000
St. Joseph & Grand Island	1,000,000
St. Joseph Belt	95,000
St. Louis National Stock Yards	100,000
St. Louis-San Francisco, and subsidiaries	550,000
St. Paul Bridge & Terminal	34,000
Susquehanna & New York	42,000
Sussex	26,000
Texas Midland	100,000
Trans-Mississippi Terminal	55,000
Ulster & Delaware	390,000
Union Freight	*8,750
Union Pacific and subsidiaries	8,000,000
Virginian	2,100,000
Waupaca Green Bay	6,383
Weatherford, Mineral Wells & Northwestern	36,000
Western Pacific	4,200,000
West Side Belt	1,080,000
Wilmington Railway Bridge Company	No cash payment
Woodstock & Blocton	19,000
Wrightsville & Tennille	22,500

*Paid to Railroad Administration.

The general method employed in making settlements was described in a report submitted by Director General Davis to the Senate on December 10, which was abstracted in the *Railway Age* of December 19.

Partial Payments on Account of Guaranty

When the year began the railroads had received only about $260,000,000 on account of their six-months guaranty, this having been advanced in accordance with the provisions of section 209 of the law, on application filed by the railroads up to September 1, 1920. After September 1, when the commission found that a long delay must necessarily ensue before final adjustment of the accounts could be made, it attempted to give the roads additional sums on account, which in its opinion would be clearly within the amount which would finally be payable. The certificates of the commission were, however, held up by a decision of the comptroller of the treasury and the efforts of the railroads to get this decision changed by a court order failed.

In its annual report for 1920, however, the commission recommended to Congress an amendment to the law, and effective on February 26 section 212 was added, which authorizes partial payments and permits the commission, in case of deferred debits and credits to railway operating income which cannot be definitely determined, to make a reasonable estimate, and when agreed to by the carrier, to use that estimate in certifying the amount due in final settlement of the guaranty. A total of 547 roads had filed returns with the commission asking for the guaranty and after $263,935,874 had been advanced under section 209, there were 447 requests filed for partial payments under section 212. After making certain adjustments in the amounts as claimed by the carriers, the commission has certified partial payments to the amount of $165,862,775.

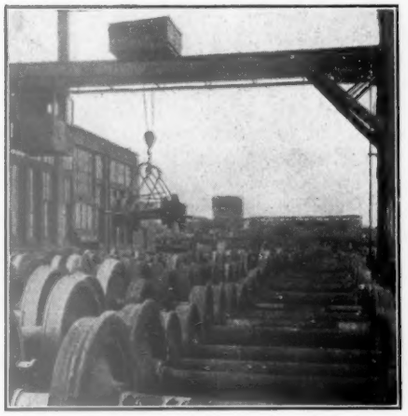
Recently the commission issued an order that the guaranty accounts should be closed as of December 31, and all claims filed by March 1.

Reimbursement for Short Lines

The commission is also administering the provisions of section 204 of the act, providing for the reimbursement of short lines which were taken under federal control and then relinquished. A dispute has arisen between the roads and the commission as to the interpretation of this law, the commission taking the position that the reimbursement is limited to those roads which after the relinquishment earned actual operating deficits, while the short lines claim that the word "deficit" as used means a decrease or falling off in railway operating income for the federal control period as compared with that of the test period.

Of 279 claims for reimbursements filed with the commission under this section 93 had no actual deficits, but the claims of these which are entitled to reimbursement under the commission's interpretation aggregate $14,128,455. The commission's estimate reduced this to $11,079,799 after certain revisions. Final settlements under this section have been made with 20 carriers, providing for the payment of $761,649 after the deductions on account of traffic balances and other indebtedness to the Railroad Administration and partial payments have been certified for a net amount of $1,357,305. The commission estimates the net total after deductions at $6,825,512. The War Finance Corporation had also advanced to railroads $204,794,520, of which $160,561,310 had been repaid to November 30.

Railroads Profit From Lower Material Costs



Marked Reductions Have Been Made in the Price of Practically All Important Commodities

By W. S. Lacher and C. B. Peck

THE RAILROADS are now a preferred customer in a buyer's market. This is a most remarkable transition from the status in the summer of 1920, when a seller's market gave first consideration to the devotees of the buy-at-any-price hysteria which was then sweeping the country. Prices in nearly all lines have been greatly reduced, as is evident from the charts showing the range of manufacturers' quotations appearing throughout this article. The decline has also been fairly steady throughout the year with considerable evidences of an upturn in the later months following a more general resumption of railroad purchases. While reductions in the prices of finished products have lagged considerably behind those of raw materials, the readjustment as regards these has also been of a substantial nature.

Marked Readjustment in the Steel Industry

The story of the iron and steel market for 1921 is one of exceeding interest and insofar as the buyer is concerned one of satisfaction as well. This year saw the disappearance of the last vestige of priorities, established prices and other distasteful features that made up the market conditions with which the purchaser became all too well acquainted during the war period. What established prices there are today outside of those for rail and one or two other items have little bearing on the actual sales.

The story of a declining market is always a difficult one to tell accurately because the real prices are not disclosed. It is only when concessions become general that they are recognized in published quotations. For this reason the trend of prices over the past year or more has been given in several charts showing the general tendencies rather than tables of specific quotations.

To get a proper perspective of the decline in the market, it is necessary to go back to the fall of 1920, when the price schedule of the United States Steel Corporation was clearly below the ruling market. Thus, the corporation's price for open-hearth rail was $47 per ton while the independents were holding out for $57 or even more and there was a great deal of uncertainty as to just what the price would be for rails delivered in 1921. All indications pointed to a readjustment upward of the United States Steel Corporation's schedules, including the rail price.

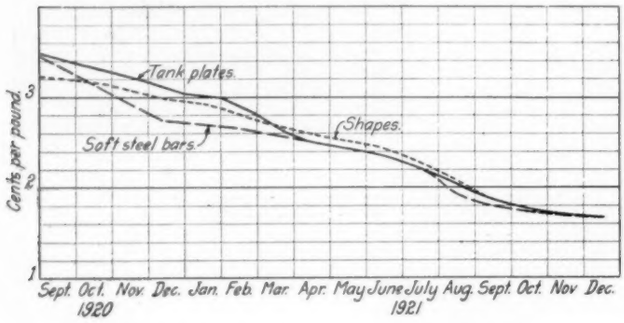
However, the softening influence of the incipient business depression was at work, and on November 19, 1920, Judge Gary announced that the established prices of the Corporation, with a few minor modifications, would remain effective in 1921. This served also to fix the price of rail at $47, and although the independents clung to the higher figure for some time, they were eventually forced to recognize the lower price. In the meantime, the independent prices for other commodities came tumbling down and by February prices were pretty well established at the Corporation level.

EIGHTEEN MONTHS have seen remarkable changes. July, 1920, saw a seller's market. Buyers scrambled to buy where and when they could at any price and for any date for delivery. Today we have a buyer's market. Sellers are making every possible concession as to both price and delivery in an effort to get a share of the business offered. Some prices have fallen more than others. In many lines the readjustment seems well-nigh complete.

The early months of 1921 witnessed an interesting reversal in market conditions. Whereas in the autumn of 1920 the Corporation's prices were below the current market, the drop of prices in the spring of 1921 saw the United States Steel quotations left on a level considerably above the actual selling prices. As this condition became more apparent rumor gained current that the United States Steel Corporation would announce a reduction in its schedule of prices and this finally took place on April 13. This reduction received publicity in the newspapers as a definite measure in the direction of readjustment, but those familiar with conditions in the market recognized at once that the new prices were still well above the active market quotations at the time and with further softening of the market the schedule quickly became a dead-letter.

On July 4 the Bethlehem Steel Company announced a new schedule of prices which was followed shortly by corresponding announcement from the United States Steel headquarters, but these schedules also fell short of the market. Since that time but limited attention has been given to established schedules, the market becoming more and more a matter of actual agreement between buyer and seller.

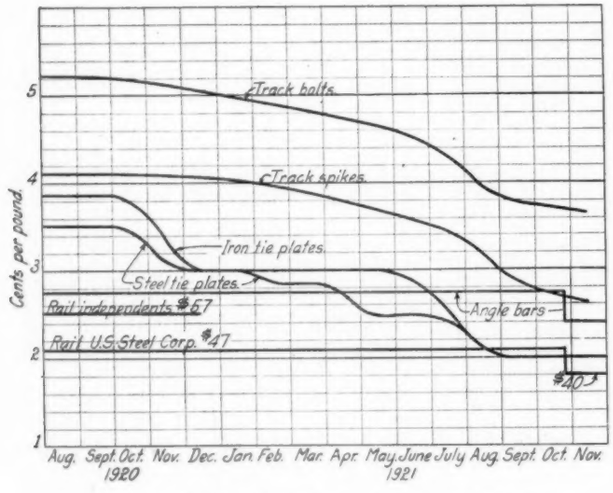
The United States Steel Corporation's price for open-hearth rails of $47 remained the basis for deliveries during 1921, but many railroads failed to make requisitions to cover their full orders so that a considerable tonnage on old orders remained on the books. This no doubt was one influence which led to a reduction to $40 announced on October 25, with a provision that it would apply alike to new contracts and unfilled tonnages on old orders. This change apparently provided the necessary stimulant to the rail market, for at least 300,000 tons of rails have been ordered subsequent to



General Tendency of Structural Steel Prices

this announcement with inquiries current for an even larger tonnage.

The decline in structural steel has been more steady and with the fall in the price of the plain material, an even greater decline has taken place in the pound prices for fabricated structural steel. In an effort to keep their shop organizations together the fabricators have cut the spread between the plain material and the finished product to a minimum. As a consequence, the railways have been able to buy steel



General Tendencies of Track Material Prices

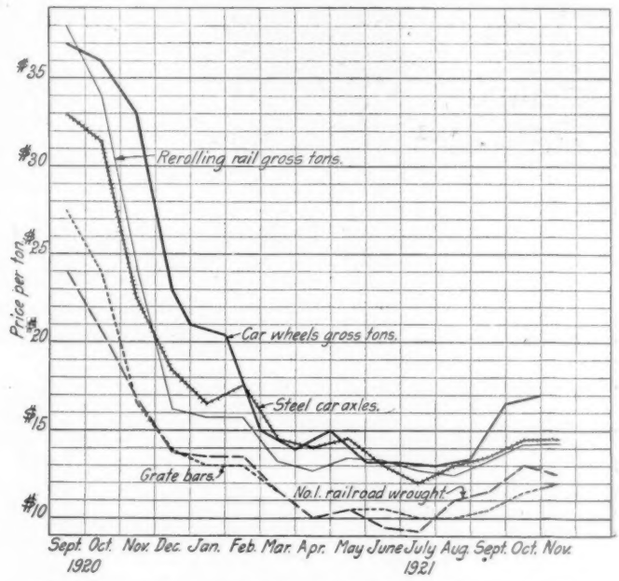
bridges during the latter part of the present year at reductions in price greater than that measured by the decline in the steel itself.

Lumber Market on a New Basis

The two tables of month-to-month quotations on lumber items of definite application to the railroad field show a steady decline of prices in the 12 months from June, 1920, to May, 1921, since which time the market has been practically stationary. In certain grades, as for example car material, there has been a well-defined upturn in recent months due no doubt to the influence of recent car orders. The railroads, unlike small consumers, buy wholesale and in many cases f.o.b. mill. Therefore, they are realizing the full benefit of the price decline to a much greater extent than the small purchaser who must buy through a retailer or jobber.

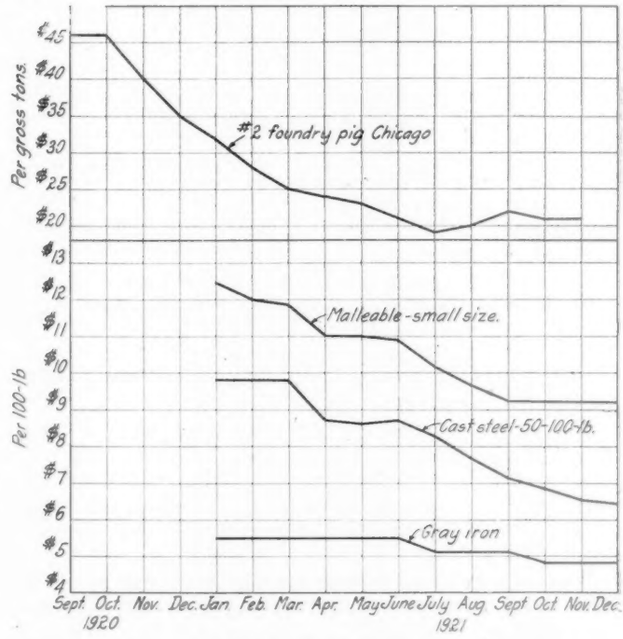
Cars and Locomotives

Last year in an article on locomotive and car prices (*Railway Age*, January 7, 1921, page 87), data were pre-



The Range of Scrap Prices in the Last Fifteen Months

sented showing the trend of prices of the various classes of equipment since 1910. Using the average price of 1910 to 1914 as 100 per cent, the prices of freight cars were found to have increased at a comparatively uniform rate from 1915,



Trend of Prices for Pig Iron and Iron and Steel Castings

reaching a maximum in 1920 of 300 in the case of all-steel cars and 313 in the case of cars of composite construction. Passenger cars, starting in 1915 from 82 per cent of the

1910 to 1914 average, increased with like uniformity to 218 in 1920. In the case of locomotives the same uniformity in the rate of price increase was not observed. Starting at 100 in 1915, the average price reached 210 in 1917 and after dropping back to 206 during the next year, recovered to 212 in 1919. Then came an increase to 251 during the first half of 1920.

In establishing these index numbers for 1920 on the basis of business done during the first six months, attention was called to the fact that very few equipment orders were placed during the last half of the year. What was true of the last six months of 1920 was also true of the first ten months of 1921. Since November 1 there has been considerably more activity in cars and index prices for 1921 must be based on November and December conditions. Such data as are available clearly indicate a marked drop in the prices from the high levels of last year, varying from 30 to 35 per cent.

In the case of all-steel freight cars the average of this reduction has been from the 300 index number of 1920 to about 213.

Similarly, composite steel and wood equipment has dropped from 313 in 1920 to about 215.

What has been said with respect to cars applies with even greater force to the locomotive ~~market.~~ Indeed, it may be truthfully said that there has been no locomotive market during 1921. It is true that several sizeable orders have been placed during recent weeks, but the number of these orders has been entirely too limited to average out the effect of special provisions in the specifications even if complete data were available for use in calculating an index number for the year. Quotations on comparable specifications have been made in 1921, ranging from 25 to 50 per cent less than those of 1920, but it is doubtful whether these comparisons are at all indicative of the trend of the conditions which would fix prices if a reasonably steady volume of business were to be established.

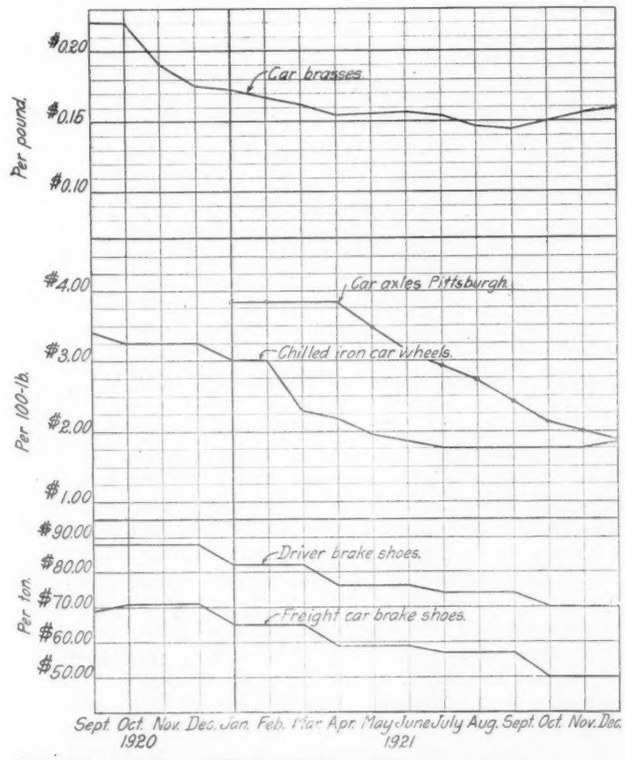
TABLE I—MILL PRICES FOR DOUGLAS FIR LUMBER

	1920						1921									
	Jan.	Apr.	June	Aug.	Oct.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Stringers, 8 by 16, No. 1, common	$33.00	$36.00	$35.00	$31.00	$27.00	$27.00	$26.00	$23.00	$21.00	$17.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00
Timbers, 12 by 12, No. 1, common	32.00	33.00	30.00	27.00	25.00	25.00	22.00	22.00	18.00	15.00	14.00	14.00	13.00	13.00	13.00	13.00
Car framing, select, common	35.00	40.00	35.00	33.00	30.00	27.00	27.00	24.00	20.00	20.00	20.00	16.00	14.00	14.00	14.00	14.00
Car sills, 41-45 ft.	40.00	45.00	40.00	38.00	35.00	32.00	32.00	28.00	24.00	24.00	24.00	17.00	16.00	16.00	16.00	16.00
Car siding, No. 2, clear and better	75.00	85.00	85.00	70.00	45.00	44.00	44.00	36.00	36.00	36.00	30.00	26.00	25.00	28.00	30.00	40.00
Car lining, select common, D. & M.	46.50	56.00	45.00	38.00	30.00	27.00	27.00	22.00	20.00	18.50	18.00	18.00	17.00	17.00	17.00	19.00
Car decking, finished select common, D. & M.	38.00	45.00	35.00	35.00	30.00	30.00	30.00	24.00	22.00	18.00	17.00	17.00	13.50	17.00	17.00	19.00
Switch ties	32.00	33.00	30.00	27.00	25.00	25.00	22.00	22.00	18.00	15.00	13.00	13.00	13.00	13.00	13.00	13.00
Crossing plank	32.00	33.00	30.00	27.00	25.00	25.00	22.00	22.00	18.00	15.00	14.00	14.00	12.00	13.00	13.00	13.00

TABLE II—MILL PRICES FOR SOUTHERN YELLOW PINE LUMBER

	1920											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Stringers 7 by 16—28 ft.	$59.00	$59.00	$60.00	$65.00	$60.00	$60.00	$59.00	$60.00	$59.00	$55.00	$47.00	$47.00
Bridge Material 12 by 12	46.00	48.00	.....	52.00	50.00	50.00	.....	.....	.....	.....	.....	.....
Car Sills 36-40 ft.	52.00	54.00	54.00	54.00	51.00	51.00	.....	.....	.....	.....	.....	.....
Car Lining	57.00	60.00	65.00	65.00	60.00	56.00	.....	.....	48.00	.....	35.00	.....
Car Decking	45.00	48.00	48.00	50.00	50.00	51.00	.....	.....	48.00	39.00	.....	.....
Crossing Plank	.....	.....	52.00	52.00	.....	.....	48.00	50.00	48.00	46.00	.....	.....

	1921									
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Straingers 7 by 16-28 ft.	$38.00	$37.00	.....	.....	.....	.....	.....	$37.00	$38.00	$39.00
Bridge Material 12 by 12	31.00	30.50	27.00	25.00	26.00	27.00	28.00	28.00	30.00	30.00
Car Sills 36-40 ft.	.....	.....	.....	.....	32.00	.....	.....	35.00	35.00	35.00
Car Lining	.....	.....	.....	.....	.....	24.00	25.50	.....	30.00	29.00
Car Decking	.....	35.00	.....	25.00	26.00	26.00	28.00	28.00	28.00	29.00
Crossing Plank	.....	.....	27.00	25.00	24.00	26.00	27.00	28.00	30.00	.....



Price Tendencies of Finished Materials Used in Maintenance of Equipment

Miscellaneous Car and Locomotive Material

Supplementing the diagram showing the trend of prices of several basic iron and steel commodities, which in a general way may be taken as an index of the trend of prices of finished materials into the manufacture of which they enter extensively, the trend of the prices of a number of finished products which are used extensively, not only in the construction of new equipment but in every-day running repairs and maintenance, are shown in one of the diagrams. Some of these materials are purchased under contract and are not quoted at uniform prices. In such cases the curves present averages of a number of quotations, and are sufficiently accurate to indicate the trend of the market.

Cost of Ties Greatly Reduced

The cross tie industry has undergone a process of severe readjustment. Prices have been greatly reduced, but owing to the wide range of conditions, variety of grades and, still more important, character of inspection, it is not practicable to present tabular data that would be representative of the entire country. The following statements are indicative of tendencies. Tie hackers in southeast Texas are now making 8-in. by 8-in., 8 ft. yellow pine ties for 25 cents and hardwood ties for 35 cents. In the north Atlantic states pine ties, delivered, now cost only about 35 cents more than they did before the war; oaks in the same territory are about 25 per cent higher than before the war. The price of yellow pine switch ties represents about the same advance over prewar prices and is equal to about two-thirds of the price of a year ago.

One road in the middle west reports that prices for ties produced locally are now about 55 cents lower than last year and very close to the pre-war basis. The following table is also indicative of changes in the prices of cross ties although it is carried only to April whereas prices have decreased appreciably since that time:

NORTH ATLANTIC STATES

	Season of 1920	April 1, 1921
White oak—7 by 9	$1.85	$1.50
Chestnut—7 by 9	1.50	0.95
Red Oak—7 by 9	1.75	1.25
Hard maple and gum—7 by 9	1.50	0.90
Elms, soft maple, etc.—7 by 9	1.50	0.90
Southern yellow heart pine	2.25	1.35
Southern yellow sap pine	2.00	0.90

SOUTH ATLANTIC STATES

	Season of 1920	Fall of 1921
Yellow pine ties, various sizes	$0.90 to $1.50	$0.40 to $0.80

The present low prices are the results of one of the most remarkable gluts the tie market has ever known. As in the case of steel, the story goes back to 1920 when the transition from government to corporate purchases in March, 1920, caused a number of the roads to delay getting into the tie market. As a consequence the railroads, generally speaking, not only scrambled for their requirements but probably overpurchased, in many cases, to a considerable amount. Freight rates went up, labor was high, preservatives increased in price, so that the ties purchased in 1920 cost the railroads more than they have ever paid for ties before. When the lumber market broke in the fall of 1920, the situation was very quickly reversed. Saw mills turned to the manufacture of ties and the roads were soon offered a large supply at more favorable prices. The condition was also influenced by the change in the labor market and the decreased demand for cotton and other agricultural products, resulting in a great impetus in tie production for right-of-way delivery.

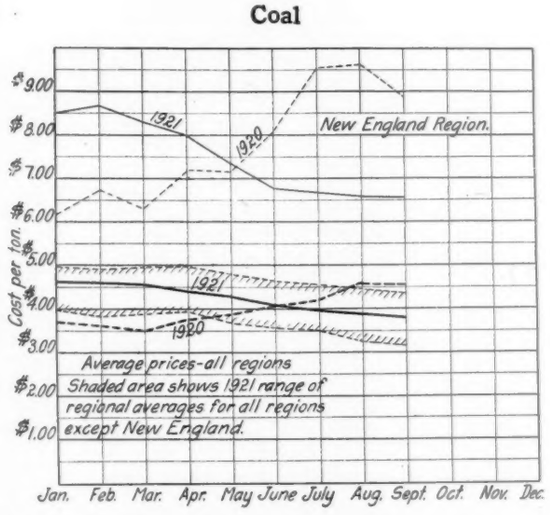
The railroads did not sense this condition at once and for a time took no steps to curtail production until they suddenly found themselves overwhelmed with the delivery of a much larger quantity of ties than they had expected to purchase. The result was that nearly all of the stronger roads, which were in a financial position to go into the tie market in the latter part of 1920 for large quantities of ties, were compelled to withdraw from the market early in 1921 and, notwithstanding drastic cancellations, some of them accumulated surpluses of ties which are sufficient to take care of all of 1922 and a part of 1923 requirements.

This greatly decreased demand has resulted in a very marked scaling down in the prices, but unfortunately many of the roads are now stocked up with ties bought at much higher figures. Consequently, participation in the low prices is restricted largely to the roads which had been compelled to limit their purchases during 1920. Another effect of the change in market conditions is the general use of a better grade of ties. The railroads have been in a position to demand them and are now securing more hardwood ties than they had been able to obtain for a number of years.

The report of the American Wood-Preservers' Association shows that 1920 was a banner year for timber treatment, the number of ties treated, 44,987,532, being larger than in any previous year, and indicating a complete recovery from the decline in treatment prevailing during the war period. There is every indication that the record for timber treatment in 1921 will also be very good, one inducement in this direction being a plentiful supply of creosote and other preservatives at much more favorable prices than have prevailed for a long time. The most important influence in this direction has been the resumption of creosote imports on a large scale from both England and Germany.

Generally speaking, the cost of railroad coal has shown a steady though not large decline during the first three-quarters of 1921. Data compiled by the Interstate Commerce Commission show a decline in the average cost of the coal used in road service by a large percentage of the Class I railroads of the United States from $4.61 in January to $3.80 in September, or about 17.5 per cent. The cost given by the Interstate Commerce Commission includes the invoice price plus freight charges and is a weighted average. A comparison of the cost by months for 1920 and 1921 for the United States as a whole and for each region is shown in Table III.

The greatest reduction within the year from a dollars and cents basis, took place in the New England region. From $8.72 in February the price declined to $6.57 in September, or 24.5 per cent. Although less in amount, reductions



Trend of Average Cost of Railroad Fuel—1921 and 1920

of 25.8 per cent and 24 per cent occurred in the Ohio-Indiana-Allegheny region and the Pocahontas region respectively, the Great Lakes region following with a decline of 20 per cent. The reductions in the western regions have been much less marked, particularly in the Northwestern region where the average cost in September was but five per cent below the price at the beginning of the year. In the Northwestern and Central regions, however, it should be noted that the trend has not been uniformly downward throughout the year In the Northwestern region the cost of fuel increased gradually from January until April, at which time a maximum of $4.96 a ton was reached. Since that time the decline has been uninterrupted. In the case of the Central Western region, although the maximum average for 1921 is shown for the month of January, with a well-marked decline in February, this was followed by increases in March and April, the average cost for the latter month being $3.95 a ton, but two cents a ton less than the cost in January.

The significant fact brought out by the graphical presenta-

(*Continued on page* 52)

New York Central Yards, East Buffalo, N. Y.

Improved Service and Morale Features of 1921

Considerable Progress Made but Pre-War Standards Not Yet Restored

By Charles W. Foss

PRIMARILY because of the aching void that the absence of it left in railway operation during the larger part of the period of federal control and a few months succeeding, railway officers and students of railway affairs were given an entirely new appreciation of that factor in railway operation known as *morale*. During 1921 there was much in the way of labor difficulties; on the whole, however, perhaps not as much as might have been expected under the trying conditions. He would be a true pessimist who would not admit that the railways have succeeded in taking a long step in the direction of restoring that old time loyalty on the part of officers and men alike. The change in that respect as compared with 1920 and 1919 is one of the outstanding features of 1921. It is not necessary to produce facts to prove that the railroads have again restored, in large measure, the morale of their men. The fact has been noticed by travelers and shippers. There is no fair-minded railroad man who will not admit it.

It is interesting to observe in what manner the improvement in railway morale has accompanied or has been accompanied by a similar improvement in railway service.

EVIDENCE of the past three or four years seems to indicate that good morale and high grade service are interrelated factors.

During the war neither service nor morale were as good as prior to the war. After the armistice both were exceedingly poor. At present both show much progress towards pre-war standards.

Competition of the right kind is one of the best assets the railroads can have.

Reasons for Improved Service

The railways today are moving freight over the road in much better shape than was the case either during the war or after the armistice. They are for the most part not producing quite the same sort of service, however, that they produced prior to the war. There are some who declare that the fact that the freight is being moved faster this year is due to the smaller amount of business that is being carried. While there can be no question that the lack of that congestion which resulted when the railroads were being worked practically beyond their capacity, is an important factor, there is still room for belief that the improved morale has been the determining feature. This would seem to be borne out by the conditions of 1919. That year was not a peculiarly busy one. It represented, however, the low point insofar as railroad service to the shippers and the traveling public was concerned.

Train Speed—Miles Per Hour

A factor that is of interest in connection with the speed with which the movement of freight is conducted may be gleaned from the operating statistics. The particular figure in mind is that of "train speed—miles per hour." The latest available figures are those for October issued recently by the Interstate Commerce Commission Bureau of Statistics. Taking the averages for the ten months ending October 31, we find that in the first ten months of 1921 the railroads of the United States moved their freight trains at an average speed of 11.4 miles an hour as against 10.3 miles an hour shown as the average for the first ten months of 1920. This indicates an improvement but for the fact that the net tons per train were but 702 in the first ten months of 1921, as against 737 in the same period of 1920. The increase in train speed does not therefore necessarily represent an improvement; it means rather that with lighter loads the trains can be moved faster, or that with less congestion on the division the trains are given a better opportunity to keep moving instead of being laid up frequently on sidings. We cannot, therefore, take the figure of "train speed—miles per hour" as our criterion.

Readers of the *Railway Age* have been hearing from time to time of rather spectacular fast movements of manifest or other freight made by different roads. Such performances as these are a somewhat better indication of improved freight train service. They point out at least that the railways

are again in a position to meet the unexpected. We can, however, hardly give too much importance to such runs. We may presume that the roads will be able to continue these performances even with traffic back to more nearly normal figures; but we can not so easily prove it to those who declare that improved freight service has been due to the fact that there is less business to handle and therefore less congestion.

Fast Freight Schedules Furnish Real Proof

The real proof, we believe, will be found in the fast freight schedules. These, as the name states, are "schedules." They are advertised and lived up to. During times of congestion, the difficulty may arise, and frequently does, of keeping them on time. They are lengthened, however, only as a last resort in times of grave difficulty. For the purpose of showing what has been happening in this direction, we reproduce in tabular form the details of the fast freight services from various important centers. There are shown the details of the services at New York, eastbound and westbound; from Boston, westbound; from New Orleans, northbound and westbound; from California to eastern points; certain details will also be given concerning the service applying on perishables from the south to the north.

Service from New York One Day Behind Pre-War

The table showing the details for New York indicates that prior to the war the carriers gave a third-morning delivery at Chicago. During the war, this was made fourth-morning. After the armistice—during that period when the railroads were in the doldrums—the service deteriorated so that fifth to eighth-morning delivery was the best the carriers could do. At present, the service is partly restored to its old time standard. On westbound traffic, fourth-morning delivery is offered—as against pre-war third-morning. On eastbound traffic, however, a third morning delivery is available for live-stock and perishables.

From New York to Kansas City similar conditions applied. Pre-war westbound delivery was fifth-morning; during the war it became seventh, if the railroads could make it; they frequently could not. After the armistice seventh-morning was promised; actually it was from ninth to twelfth. At present the railroads have restored this service to sixth-morning delivery, one day behind pre-war performances. On eastbound live-stock and perishables, however, fourth-morning delivery is offered.

FAST FREIGHT DELIVERIES FROM NEW YORK

(Figures indicate morning delivered)

City westbound from N. Y.	Pre-war	During war	After armistice	Present	Present eastbound live-stock and perishables
Chicago	3rd	4th	5th to 8th	4th	3rd
St. Louis	3rd	4th	6th to 10th	4th	3rd
Kansas City	5th	7th to 12th	7th to 12th	6th	4th
Columbus	2nd	3rd	3rd	3rd	...
Cleveland	2nd	3rd	3rd	3rd	...
Toronto	2nd	3rd	3rd	3rd	...
Detroit	2nd	3rd	3rd	3rd	...
Toledo	2nd	3rd	4th	3rd	...
Buffalo	1st afternoon	3rd	3rd	2nd	...
Pittsburgh	2nd	3rd to 5th	3rd to 5th	2nd	...
Baltimore	1st	2nd	2nd to 3rd	2nd	...
Washington	1st	2nd	2nd to 3rd	2nd	...

In general it will be found that in most of this service between New York and points to the west the service was not quite as good during the war as before the war, that following the armistice it was exceedingly poor, but that at present it is as a rule one day slower than before the war.

Boston Service Restored to Pre-War Basis

The service out of Boston, it will be noted, has been restored to its pre-war basis. Boston now gets the same service to points west as New York. Prior to the war fast freight service from Boston was one day behind New York.

There are many interesting features in connection with this fast freight service out of New York and in general from Atlantic seaboard points. One of them is Baltimore & Ohio Train 97. This train is making fourth-morning delivery at Chicago from New York, Philadelphia, and by means of a connection with Train 93, from Baltimore. We are advised that it is keeping to its schedule. Prior to the war Train 97 was scheduled to make third-morning delivery at Chicago from Baltimore and Philadelphia.

From Boston westbound	Pre-War	Present	Present eastbound Live-stock and perishables
Chicago	4th	4th	4th
Cleveland	3rd	3rd	3rd
Toronto	3rd	3rd	3rd
New York, either direction	1st morning	1st morning	...

Service North and West from New Orleans

The congestion during the war period was most severe on the lines serving the Atlantic ports, which explains in great measure the reason for the lengthening of the schedules during the war period, although not during the period following the armistice when such congestion as existed was due less to heavy traffic than to other factors. The lines serving New Orleans were not as seriously congested as those serving Boston, New York, Philadelphia or Baltimore. Nevertheless, the war schedules out of New Orleans were a trifle slower than pre-war standards. In some cases, the pre-war schedules have been restored, i. e., as to Los Angeles and San Francisco. In still other cases there has been a partial improvement without getting back to the pre-war standard, i. e., as to Chicago, St. Louis, St. Paul, etc.

In this connection it might be noted that some of the Southern lines work their schedules differently from the eastern carriers. Whereas the eastern lines operate symbol trains with stated times of departure and arrival, the practice on some of the southern lines is to offer a preferred service, whereby extras are started out when the train is ready and allowed a certain time to destination. The service is a special service distinguished in some cases from the regular fast freight service and is given provided the shipper supplies a certain minimum number of cars, 5, 7, 10, 15, etc., as the case may be. Trains operated in this way were given before the war 58 hours to Chicago. During the war, this was lengthened to 72 hr.; it has now been reduced 67 hr. 30 min. St. Louis was given a time of 45 hr. before the war; during the war 55, at present 49, etc. There are other instances where the service was slowed up during the war, where improvement has since taken place but in which pre-war conditions are not yet entirely restored.

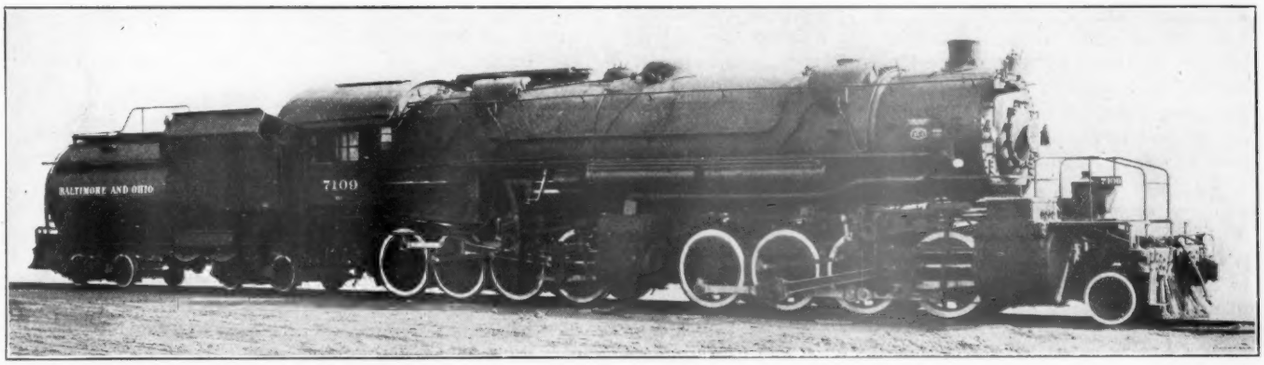
PREFERRED SERVICE GIVEN PERISHABLE FREIGHT

From New Orleans northbound	Pre-war	During war	Present
Chicago	58 hr.	72 hr.	67 hr. 30 min.
St. Louis	45 hr.	55 hr.	49 hr.
Kansas City	55 hr.	72 hr.	56 hr. 30 min.
St. Paul-Minneapolis	82 hr.	92 hr.	92 hr.
Louisville	52 hr.	52 hr.	55 hr. 30 min.
Indianapolis	60 hr. 45 min.	69 hr. 20 min.	64 hr.
Los Angeles	133 hr. 40 min.	...	133 hr. 40 min.
San Francisco	165 hr. 30 min.	...	165 hr.
Denver	...	...	99 hr. 15 min.
Seattle	...	...	192 hr.

Schedules from California

The schedules from California to eastern points on perishable freight are at present one day behind the pre-war basis. Prior to the war the schedule from California to Chicago was 7 days—to New York, 10 days. During the war the schedule from California to Chicago was 9 days

(*Continued on page 57*)



Baltimore & Ohio Mallet 2-8-8-0 Freight Locomotive

Recent Tendencies in Locomotive Development

Demands for Efficiency Forcing Changes in Design—Capacity and Reliability Alone Not Sufficient

By R. C. Augur

IT IS WISE occasionally to stop and look back over the road that has been traveled before looking forward to see where the road is leading. If a comparison is made between typical freight, passenger or switch locomotives of the present day and those which were considered modern 20 or 30 years ago the differences are striking. The progress of the years has been marked by a steady increase in size, weight, power and efficiency. Every such increase has either been brought about by, or has been accompanied by, an advance in car weight and capacity and in average train tonnage. These changes have necessitated the introduction of such strong couplers, draft gears and car frames that there are serious dangers in an attempt to handle small old cars mixed in trains of heavier high-capacity cars. There are consequently many cars still in existence that are not safe to use in general traffic.

The increase in weights of rolling stock have also made necessary the rebuilding of bridges and the laying of heavier rails, followed by steadily greater outlays for track maintenance. These investments have unquestionably been well warranted and have proved profitable in places where there was a heavy traffic in ore, coal and low grade freight. It is possible, however, that the efforts to obtain an increase in train tonnage have caused the movement to go farther than was economically wise on some roads where the bulk of the traffic consists of general freight or which handle a large amount of such short seasonal freight as grain. Taking every item into consideration the price paid for the increase in train tonnage has been a large one. Would it not be advisable for the American Railway Association to undertake an investigation of the effect of the various factors which enter into the over-all cost of moving the traffic to determine definitely what are the most economical practices under different conditions?

INCREASING ATTENTION is being given to points of design that affect the efficiency of boiler or engine. Such radical innovations as steam turbines and Diesel engine locomotives are being tested.

Locomotives have been rendered obsolete in the past because they did not have the power to haul heavy trains necessary for the economical movement of traffic. Many existing locomotives must be retired unless rendered more economical in fuel and maintenance costs.

Turning to passenger trains we note a tremendous increase in the weight of passenger cars; where an American type locomotive formerly hauled an express train, a Pacific type is now found to be unable to make the time and a Mountain type is being substituted. The amount of dead weight per passenger would seem to be greater than necessary and it is hoped that the future will see an improvement in this respect.

What of the Future?

The evolution of the locomotive has been slow, but steady, as is true of the evolution of any piece of machinery. It is a case of the survival of the fittest, every modification having to meet the acid test of time. The development in the past has been noticeable mostly for the growth in size and capacity. Increase in capacity, however, has not been due entirely to changes in size and weight since the general adoption of improved designs and the introduction of desirable appliances has resulted in a marked gain in efficiency as well as capacity.

The trend of development in the immediate future will probably not be so much in the direction of size as along the lines of greater thermal efficiency together with an increase in the durability and reliability of the machinery. This will reduce the expenditures for maintenance, decrease the time required at terminals, make much longer runs practical and lengthen the mileage between shoppings for heavy repairs. Much more attention will unquestionably, and with advantage, be given to improvements in details of design, points which it has not been necessary seriously to consider when fuel was abundant and labor less expensive.

The Locomotive Boiler

The locomotive boiler in its present form is the result of the efforts of years to reach the maximum capacity with the

minimum increase of weight and size. Efforts in the future will be directed toward obtaining a steadily increasing amount of steam for each pound of fuel consumed, without sacrificing any of the capacity that has been acquired by past exertions. With this object in view every detail of design will be subjected to a more critical scrutiny than has been customary hitherto.

The size and relative proportion of grate area, firebox volume, combustion chamber, length of tubes, distribution of heating and superheating surfaces, air openings through grates, air inlets to ash pan and circulation within the boiler, together with the purification and heating of feed-water by exhaust steam or waste gases, are some of the points that will be given greater consideration. At present far too much energy is lost in waste gases and in exhaust steam, losses which will probably be considered as inexcusable at no very distant date and characteristic of an extravagant past. Although efficiency will be given prime consideration, the question of a minimum maintenance expenditure and a minimum amount of attention and loss of time while in the shop will not be lost sight of.

The present arrangement of the front end and the means by which the necessary draft is secured is extremely simple and highly effective but no one would dream of calling it efficient. The defect has long been recognized and although it is not apparent that any other arrangement could be substituted without too much complication, the future will probably see a serious attempt to improve this method.

The Locomotive Engine

It is the function of the engine to produce the desired drawbar pull and furthermore, it should produce this drawbar pull with a minimum consumption of steam. The future will probably witness some marked developments in the direction of increased efficiency. Lower cylinder clearances, improved steam distribution, a reduction in exhaust pressure, and a better adjustment of the cut-off in relation to speed will demand increasing attention.

The use of a condenser has been proposed, but the added complication, the additional space required and the increase in cylinder size which would tend to exceed the clearance limits makes its adoption highly improbable unless other radical changes are made.

The day of the compound, at least in this country, ended with the advent of the superheater. It never was popular on American railroads but has been extensively used in Europe. It is interesting to note that even in those countries where it has been long and extensively employed the tendency towards its abandonment has been strongly marked, especially during the past year. Aside from Mallet locomotives, no compounds have been brought out in the United States and comparatively few new designs are being made in any other country.

In Europe, where crank axles and multiple cylinders are not considered as unwarranted complications, the present tendency is in the direction of four-cylinder or three-cylinder simples, with an increasing tendency toward the adoption of the latter, although the counterbalancing is not as perfect as in the four-cylinder type. This practice of using more than two cylinders is largely due to greater restriction in clearances than are common in this country. Despite the prevailing prejudice, it is by no means improbable that engines of the three-cylinder type will in the near future be tried out for large size freight locomotives. The more uniform torque will make it possible to reduce the factor of adhesion, while the smaller diameter of the pistons and the lessened over-all width will be favorably received. Counterbalancing will also be simplified.

With the increase in production of alloy steels, a better knowledge of the methods of working them, together with a widening appreciation of the necessity and advantage of heat treating, it is probable that there will be a considerable extension of their use in locomotive construction.

During the last few years marked advancements have been made in the development of light non-ferrous alloys of high tensile strength. Some of these alloys may prove to be suitable for pistons or other reciprocating parts where a reduction in weight would be highly desirable.

Turbine Locomotives

The steam turbine years ago won recognition as the stand ard prime mover in large stationary power plants and also has been extensively used in the marine field. Its high efficiency, simplicity and large power for limited space and weight have forced locomotive designers to consider seriously the problem of its application to the locomotive. Thus far the pioneer work has been done in Europe, where the fuel costs are greater than in this country. In Switzerland, the Winterthur Locomotive Works has fitted up a locomotive with a Zoelly turbine. At Stockholm a Swedish State Railway locomotive has been equipped with apparatus furnished by the Ljungstroms Steam Turbine Company. Both of these locomotives are now being tested and according to reports are showing satisfactory results.

In general appearance the locomotives closely resemble old familiar designs. A high-speed turbine is coupled to the driving wheels through a reduction gear, the exhaust carried to a condenser and a fan provided for creating the draft. In England a turbine locomotive with electric transmission is being built by Sir W. G. Armstrong, Whitworth and Company. In Italy a small switching locomotive driven by a Belluzo turbine has been in service for a number of years. As a result of this experience a large Pacific type road locomotive is now being fitted up. A number of other turbine locomotives have been designed, or are under construction, although but little information is yet available in regard to them.

Diesel and Other Internal Combustion Locomotives

Internal combustion engines designed to use gasoline or a similar fuel have been employed to a considerable extent for driving small locomotives of the type required for mines, industrial plants and light switching purposes. Common sizes have varied from 50 hp. to 75 hp.; in some cases they have been made of 150 hp. The field for the use of such engines appears to be limited to small, special locomotives and to motor rail-cars hauling not more than one trailer.

The Diesel or heavy oil engine has been developed to a high degree of efficiency and reliability. It has not only been a success for submarines, but is now being used for merchant ships in all parts of the world. These engines are far more efficient than any type of steam apparatus, but unfortunately have been bulky, heavy, complicated and expensive to build. The efficiency has been so attractive, however, that several Diesel locomotives have been brought out in Europe. Some of these were of the Diesel-electric type and others had the engines direct-connected.

It is possible that the recent development of the compound Diesel engine in this country will go a long way toward solving the problem of the Diesel locomotive and that it will find a definite field in railroad work. At the present time it would appear that its greatest usefulness would be in those localities where fuel is expensive and the traffic not sufficiently dense to warrant the heavy expense of electrification. It may require years of work to perfect and bring into extensive use the Diesel locomotive, but a number of such machines undoubtedly will be constructed in the near future and the results obtained will be watched with interest.

As a transportation unit, the present steam locomotive is a highly developed specialized machine. Still it is probably only in its infancy and the future may see many unexpected, if not radical, developments.

A Train of Seventy 100-Ton Cars on the Norfolk & Western

Many Special Types of Cars Introduced in 1921

High Capacity Equipment Most Notable Development; Concrete Cars in Europe

By A. F. Stuebing

DURING RECENT YEARS the design of cars has tended gradually toward the adoption of a few major types. Few new methods of construction have been adopted and the principal variations were those dictated by local conditions. During the year just past, however, a new tendency has manifested itself. New types have been developed, some to meet special operating conditions, and others to handle special classes of traffic more efficiently. The resourcefulness of railroad officers and equipment builders is exemplified in several notable developments, the most important of which are the high capacity gondola cars, container cars and self-propelled motor cars.

THERE HAVE BEEN THREE outstanding developments in car design. High capacity gondola cars have enabled coal carrying roads to increase the tonnage per train and reduce operating costs. Container cars have facilitated the handling of mail, express and less than carload freight. Self-propelled cars have practically solved the problem of passenger service on branch lines.

Concrete freight cars, container cars and a novel five-car dining unit have been built in Europe.

High Capacity Coal Cars

Unquestionably the most important step in the development of freight car equipment during the year was the extensive introduction of cars of extremely high capacity for handling coal between the mines and the car dumpers at tidewater and at the lakes. The three roads handling export coal at Hampton Roads all adopted new and heavier car equipment during the year. The Virginian, after prolonged trials of four different designs, placed in service 1,000 cars of 120 tons capacity, the largest units in general service on any road. These cars have made it possible for the Virginian to increase the trainload to a point never before attained, the maximum train consisting of 110 cars weighing 17,250 tons.

Shortly after the 120-ton cars were placed in service on the Virginian, the Norfolk & Western received 500 cars of 100 tons capacity, which were likewise designed for hauling coal from the mines to the car dumpers at tidewater. The notable features of this equipment are the new design of six-wheel truck which carries the load on side bearings instead of on the center plate and the high ratio of load to total weight—78.9 per cent.

The high capacity cars of the Chesapeake & Ohio, like those of the Norfolk & Western, are of 100 tons capacity. They differ from either of the other designs in having drop doors, which adapt the cars for general service where dumpers are not available.

The three cars mentioned are all equipped with six-wheel trucks. Although the additional pair of wheels has been considered necessary on these high capacity cars to keep the load on the axle, journals and wheels within proper limits, the six-wheel truck has certain disadvantages. Trials are now being conducted to determine whether it is feasible to operate cars of 100 tons capacity with four-wheel trucks. This type of car would impose a load of about 65,000 lb. on each axle. There is a question whether the metal in the wheels and in the rails can bear such a heavy load without flowing and without rapid failures. If no difficulty is experienced due to the concentrated load, the four-wheel truck will probably become the prevailing type for cars up to 100 tons capacity. The ratio of load to total weight could probably be made higher in such a car than in one with six-wheel trucks and the ease of maintaining the four-wheel truck would be a decided advantage.

The Container Car

Another important development of the past year was the container car. This type of equipment has been used by the New York Central for express, mail and less than carload freight service, and the Boston & Maine is planning to

introduce a slightly different design of car in local freight service. The general advantages of the container system were brought out in an article in the *Railway Age* of December 10 and further comment is unnecessary. There appears to be a wide field for container cars and as soon as the details of design are worked out and difficulties of handling at terminals are overcome, an extensive development is to be expected.

Self-Propelled Cars

The need for reliable and economical self-propelled cars for service on branch lines has resulted in the construction of many types of equipment in the past, few of which have remained in service for any considerable time. The problem of designing a satisfactory car for this service now seems well toward solution; in fact, three types having as the source of power steam engines, gasoline engines, and electric motors receiving current from storage batteries have now passed the experimental stage. At least one of these types should be suitable under almost any local conditions. The motor car, like the container car, gives promise of reducing the cost of handling a class of service which in the past has been a liability, rather than an asset, on many roads.

Car Construction in Foreign Countries

Economic, industrial and political conditions in European countries have all influenced the recent design of cars. For example, Poland is experimenting with a modified type of container car in which the bodies are interchangeable on several types of running gear in order to overcome the handicap of the three gages, the Russian 5 ft., the German standard gage and the narrow gage. In France, Germany and Austria concrete cars have been built and have apparently met with a fair degree of success. Only one concrete car has been built in this country but it is probably fair to say that under American conditions concrete is not satisfactory as a material for freight cars. In Germany, on the other hand, it is stated that concrete cars are technically and economically feasible and the use of this material does not increase the weight of the equipment as compared with steel construction.

There are numerous reasons why concrete may be applicable abroad but not in this country. The European cars are smaller, trains are lighter and the screw coupling eliminates the severe shocks in road service due to slack between cars. It is still too early to judge the relative merits of wood, steel and concrete. The elimination of decay and corrosion would be an important advantage for the concrete car if not offset by abrasion and disintegration. At the present stage the concrete cars are of interest chiefly because of the possibilities of future development.

Articulated Dining Train

One of the interesting developments in Great Britain is the construction of a dining unit of five cars on the articulated principle. The passenger train cars on British roads are much lighter than in this country. Whereas six-wheel trucks are necessary in America, the cars in England do not even tax the capacity of four-wheel trucks. In certain classes of service where the cars can be kept together, the Great Northern Railway of England has joined several cars permanently and instead of placing two trucks under each car, has located a single truck under the abutting ends of two coaches. The advantages claimed for this arrangement are improved riding qualities, due to a reduction of oscillation, and reduced weight. The articulated dining unit of the Great Northern consists of one first-class and one third-class corridor coach, first and third-class dining cars and a kitchen car. The five cars measure 246 ft. over buffers and are carried on six four-wheel trucks. In making up a train cars can be added at either end, but the five-car unit cannot be separated. The weight per passenger of this equipment is 27 per cent less than the ordinary cars formerly used. It is interesting to note that the kitchen in this car is fitted with electric ranges, the current being obtained from two axle generators under the car. So far as known this is the first application of electric cooking in dining car service.

Railroads Profit From Lower Material Costs

(*Continued from page 46*)

tion in the diagram is the steady upward trend of prices during the first eight months of 1920 for the United States as a whole and notably for the New England region, as compared with the general downward tendency during the past year.

The trend of railway fuel costs shows little relation to the conditions in the spot coal market. While there has been a steady decline in the average cost to the railroads as a whole during the first nine months of 1921, there has been no marked change in the trend of spot coal prices from February to the end of the same period, either upward or downward from the average government price of 1918. During the months of October and November, however, spot prices have shown a marked downward tendency, which, it may be said, has probably had little influence on the trend of railway fuel costs during the same period.

TABLE III—AVERAGE COST OF COAL PER TON BY MONTHS, FIRST THREE-QUARTERS OF 1920 AND 1921

(Invoice Plus Freight)

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	9 mo. average
New England Region	1921	$8.54	$8.72	$8.31	$8.01	$7.33	$6.77	$6.66	$6.59	$6.57	$7.55
	1920	6.18	6.77	6.32	7.20	7.18	8.14	9.56	9.61	8.88	7.63
Great Lakes Region	1921	4.99	4.93	4.86	4.29	4.46	4.03	4.11	4.03	3.99	4.45
	1920	3.86	3.80	3.59	3.89	4.21	4.35	4.30	4.60	5.22	4.19
Ohio-Indiana-Allegheny Region	1921	4.28	4.22	4.11	4.02	3.93	3.68	3.48	3.27	3.17	3.81
	1920	3.00	3.12	3.05	3.46	3.68	3.83	3.92	4.26	4.16	3.65
Pocahontas Region	1921	4.44	4.29	4.10	3.92	3.69	3.56	3.48	3.42	3.37	3.84
	1920	2.80	2.88	2.84	3.09	3.44	3.82	4.06	4.48	4.38	3.53
Southern District (excl. Pocahontas)	1921	4.41	4.40	4.38	4.21	4.11	3.97	3.87	3.67	3.57	4.10
	1920	3.38	3.41	3.25	3.42	3.70	3.70	3.98	4.48	4.21	3.71
Northwestern Region	1921	4.61	4.87	4.94	4.96	4.79	4.62	4.57	4.46	4.37	4.67
	1920	4.28	4.01	3.77	3.86	3.91	4.00	4.13	4.60	4.56	4.13
Central Western Region	1921	3.97	3.83	3.87	3.95	3.80	3.79	3.72	3.68	3.57	3.80
	1920	3.75	3.05	3.13	3.27	3.23	3.36	3.40	3.57	3.52	3.35
Southwestern Region	1921	4.25	4.13	4.12	4.10	4.05	4.04	3.96	3.92	3.82	4.05
	1920	4.48	3.98	3.67	3.84	3.91	3.80	3.77	4.47	4.50	4.06
United States	1921	4.61	4.61	4.56	4.39	4.28	4.07	3.99	3.88	3.80	4.26
	1920	3.71	3 58	3.45	3.72	3.89	4.03	4.20	4.55	4.55	3.97

Maintenance-of-Way Is Now on the Upgrade

Railroads Are Slowly Restoring Tracks to Normal Condition —Renewals Still in Arrears

By W. S. Lacher

JUDGING FROM RELATIVE expenditures and rates of pay in 1920 and 1921, one would gain the impression that the year just past was one of greatly restricted performance. This would be the case without doubt if it were not for the fact that certain influences have served to compensate for the seeming disparity in outlays. Because of this it is conceded that most of the tracks are now in better condition than they have been for some time insofar as the line, surface and riding qualities are concerned, and that in consequence the roads have entered the winter season in a more favorable, though not entirely satisfactory condition.

Expenditures for maintenance-of-way work for the first ten months ending October 31, 1921, were $651,551,597 as compared with $878,074,290 and $647,326,552 for the corresponding periods of 1920 and 1919, respectively. These figures are not subject to exact comparison because of the influence of the wage increase effective May 1, 1920, and the wage reduction of July 1, 1921, but in general the effect was to make the work more expensive as regards the rate per hour during 1921 than in either of the preceding years.

In the early months of the past year when the roads were confronted with operating deficits, maintenance-of-way work was restricted to bare necessities and the opening of the season for the active prosecution of the work was delayed until later than usual, much work being held up until July. However, active work during that month and the three months following was effective in accomplishing an appreciable improvement in conditions.

Other factors must also be taken into consideration. The winter of 1920 and 1921 was exceedingly mild so that the tracks came out of the frozen period in much better condition than usual. Following this the country generally had one of the longest and most satisfactory summer seasons that has been experienced for many years. Furthermore, the limited volume of traffic proved of considerable advantage, both in the reduced wear and tear on the fixed property and in the decreased interference with maintenance-of-way operations. However, the largest single factor which was favorable to the accomplishment of a good season's work was the increased efficiency of the men. This was by far the most encouraging phase of the maintenance-of-way situation which has occurred on the railroads during the past year.

To accomplish the favorable showing in spite of the limited expenditure, attention was concentrated on necessary items of upkeep. Renewals received less attention, although lack of specific statistics makes it impossible to present any definite facts. Rail consumption in 1920 in the sections used in standard gage track averaged well up to the previous years. During 1921, however, production in the mills was somewhat slow because the roads did not specify fully on their orders. Although no statistics as to quantities are available there is no question but that little progress was made in taking up the large accumulation of rail renewals which have been deferred from year to year since almost the beginning of the war period.

Evidence of further activity in the direction of corrective measures is noted in recent large orders and inquiries for rail by roads in both the United States and Canada. A plan for the purchase of 1,000 miles of 100 lb. rail by one large system is particularly emphatic on this point.

The condition also is not favorable in the case of cross ties. Renewals in 1920 were restricted because of inadequate supplies of ties. This situation as to supply was improved during 1921, but renewals were restricted because of a failure of the roads to prosecute the renewal program to the fullest extent. Therefore, with ties, also, the bulk of the deferred renewals still remains to be made.

One item which has been largely neglected is painting. Many roads dispensed with their painting forces entirely. This means that enlarged programs must be undertaken eventually to make up the deficiency. Such items as weed cutting and general policing were also given less than normal attention.

EXPENDITURES for maintenance-of-way during 1921 will probably total only three-fourths as much as in 1920.

Concentration on essentials, decreased cost of materials and increased efficiency of labor have enabled the roads to put the tracks in reasonably good condition.

Marked improvement has been made in the spirit and industry of the forces but little progress has been made in reducing the accumulation of deferred renewals.

Labor Efficiency Improved

The thought behind maintenance-of-way operations during the working season of 1921 was to improve the efficiency of labor by taking every advantage of the favorable condition of the labor market. In the early months of the season many of the subordinate officers were inclined toward the opinion that the growing differential in wages paid by the railroads and those generally prevailing outside were primarily responsible for the greater industry observed in the

railway forces. These officers were, therefore, somewhat chagrined when they learned of the reduction in wages authorized by the Labor Board on June 1, 1921. However, it did not take them long to discover what others had realized all along, namely, that the rate of wage is a minor factor at times when the number of jobs is smaller than the demand—that men will exert themselves to hold a job whenever they know that another is not to be had.

The campaign for increased production was directed primarily at the supervisor and the forman in impressing on them the fact that performance records of the past five years are in no sense a measure of the reasonable volume of work to be expected from the men; in other words, this was an abnormal period in which the average performance of men was far from satisfactory. This situation was also improved to an extent in industrial centers by enlisting the services of old foremen who had entered more profitable employment during the war period. With the current depression many of these men have been glad to get back into track work. The same is true in a large measure of the laborers. For example, many high-grade Italian trackmen who had obtained employment in more remunerative lines during the war period were reenlisted in railway work during the past season.

On the other hand, men of certain nationalities from southeastern Europe who have been found generally unfit for railway work have been very largely eliminated. These various measures have all served to raise the general tone of the forces; the men take more interest in the work and a larger output is accomplished. Some maintenance-of-way officers have gone so far as to say that the efficiency now is as high as at any time in the past.

But in spite of the notable improvement in the performance of the men, the roads have felt deeply the restrictions which prevent them from taking at least partial advantage of the prevailing low rate for common labor. Not only is there a great differential in favor of the railway employee as regards wages, but the standardization of wages is peculiarly unjust to the roads. The rate for trackmen, which is nearly the same the country over, is in some localities now nearly double the rate at which men could readily be obtained in adequate numbers.

Roads Turning to Contract Work

Partial relief was obtained by a number of the roads through the contracting of some of the major items of maintenance-of-way work, such as rail and tie renewals and ballasting. Cost plus and force account agreements have been applied in part to this work but growing favor is being evidenced for the contract form under which the work is awarded on the basis of unit price bids for the various items covered. This plan can only be put into effect where both the railways and the contractor are in possession of sufficient cost data to enable them to have a fair check on the reasonableness of the bids offered and taken. The railroads which have tried both systems are now inclined to favor the unit price arrangement as being most equitable and as offering the least opportunity for criticism.

An idea of the extent to which general interest has been manifested in the contracting of maintenance-of-way work is indicated by the fact that the Committee on Economics of Railway Labor of the American Railway Engineering Association has been at work during the past year on the development of specifications suitable for use in such contracts. The general interest in this subject is in no sense to be measured by the number of roads which have followed the practice during the past season and it is certain that unless some means are devised by which the railroads are enabled to secure track labor at a rate considerably below that prevailing at present, nearly all work other than routine policing by section forces will be conducted under some contract arrangement.

Tendencies of the Times

Certain influences and tendencies which have been manifest for a longer period than a single year have been given an added impetus during the past 12 months. Further progress has been made in the adoption of heavier sections of rail. Fifteen out of 25 of the larger roads are now buying rail weighing more than 100 lb. per yd. and at least two introduced these heavier sections in 1921. Similarly many roads using rail of less than 100 lb. section have the adoption of heavier sections under advisement. Some heavy designs of joint bars represent an accompanying development. The use of heat-treated, high-carbon or other special steels for tie plates, joints, bolts and spikes has been given further impetus, a more receptive attitude of manufacturers being a factor of importance.

One of the noteworthy tendencies during the past year has been the expression of a general need for improved methods of accounting in maintenance-of-way work. This is prompted by the feeling that the records made to satisfy the requirements of the Interstate Commerce Commission do not provide the maintenance-of-way officer with the information which he should have as a measure of the work done by the various forces under his direction and for the fixing of budgets for the monthly distribution of annual appropriations. Thus far only a very limited amount has been done in the actual development of such systems of performance records, but various associations and individuals have emphatically advocated this plan. The fact that the need of better records has been expressed by railway men in important official positions gives promise that this movement will be given a general impetus. When it has been accomplished the incentive for efficiency will be more nearly of the same measure as that now obtained in industrial plants conducted under the control of such systems.

New York Central Shop, East Buffalo, N. Y.

Cutting Freight Loss and Damage in Half

Packages Properly Prepared for Shipment

What Happens to Freight Improperly Prepared for Shipment

Freight Claim Division of A. R. A. Has Developed Successful Campaign

By K. H. Koach

WITH THE SLOGAN "Cut Loss and Damage in Half—It Can Be Done," the freight claim division of the American Railway Association has conducted a vigorous campaign during the past year to reduce by at least 50 per cent the amount paid out in the settlement of freight claims. Figures relative to the work of this organization are now available for the year September 1, 1920, to September 1, 1921, to which period this article is confined except for a few of the more important matters handled by the division during the last four months of 1921.

The present operations of the division may be divided into three general phases. The first has for its object the minimizing of controversies in connection with freight claims, and the corresponding expenses incident to litigation brought against the carriers by the shipping public. This has been accomplished by conferences with the representatives of commercial organizations, and also by keeping current and effective the freight claim rules and rulings, which, in their operation, facilitate the investigation of freight claims and the adjustment with claimants.

The second objective is to make the freight claim rules and rulings more effective in order to maintain the least expensive methods of claim investigation and accounting by the carriers. Particular attention has been given to the claims filed in connection with freight moving over several lines in order to avoid the necessity of litigation and prolonged disputes between carriers; likewise controlling the expense of lawsuits for claims filed by one carrier for loss or damage which may have occurred on a connecting line.

The third phase of the work is that promoted by the claim prevention committee. This committee inaugurated an educational campaign through personal conferences with representatives of the various branches of transportation service, such as the freight claim, claim prevention, and operating departments, and followed it with a large amount of correspondence, supplemented by bulletin service, all of which outlined methods and suggestions for improved service. Much has also been gained by the co-ordination of the activities of sectional claim conferences, which conferences in turn co-ordinate the activities of the various carriers in each of the various sections of the country.

FREIGHT CLAIM DIVISION of A. R. A. has conducted a vigorous campaign to cut in half the freight claim payments, which exceeded $120,000,000 in 1920. The number of claims filed has been reduced from 335,540 in November, 1920, to 208,404 in August, 1921.

The collection of statistics, dissemination of information, co-ordination of freight claim work on the various railroads, perfect package campaign and freight claim prevention congress are other activities of the division.

Claim prevention representatives have concentrated their efforts during the past year upon the following causes, which contributed approximately 80 per cent to the loss and damage account in 1920, namely: (1) robberies, (2) rough handling, (3) loss of entire packages, (4) defective equipment, and (5) delay.

Loss due to robberies averaged nearly $2,000,000 per month in 1920, and was confined mainly to such commodities as clothing, dry goods, notions, boots and shoes, tobacco, cigarettes and cigars. "Rough handling" totaled almost $1,000,000 per month, and was largely chargeable to improper switching in yards. "Loss of entire packages" was responsible for claims amounting to more than $1,250,000 per month, and was due apparently to certain definite causes, the correction of which calls for uniform action in the handling of astray packages. "Defective equipment" cost nearly $1,000,000 a month and was confined largely to grain, flour, mill products and coal. "Delay" caused payments of $500,000 per month, affecting mainly fresh fruits, vegetables and live stock. The total freight loss and damage expenditure for the first six months of 1921, as compiled from the reports of 227 carriers, representing 90.4 per cent of the railroad mileage in this country, was $55,707,753.

Largely through the efforts of the Freight Claim Division of the American Railway Association, a curtailment of this drain on freight earnings has been effected during the past

year. Realization of this fact has resulted in the rapidly growing interest which the carriers have shown in claim prevention work. The old method whereby each road handled its own claim problems has now become practically obsolete. In September, 1920, the number of carriers reporting to the Freight Claim Division was 165, while in July, 1921, the number had increased to 230. With last year's growing interest in the Freight Claim Division and its claim prevention work, the results so far have shown that the number of claims is gradually being lessened each month, and that the carriers are giving closer supervision to the problem than ever before. The total number of claims received by the carriers from claimants in November, 1920, was 335,540, which number was reduced to 208,404 by August, 1921. The number of claims paid to claimants in January, 1921, was 314,178, which number was reduced to 206,684 by the end of August. The number of unadjusted claims at the close of November, 1920, was 548,097, this number being reduced by August, 1921, to 290,275.

The outstanding feature of last year's work was the employment of three experienced men as special representatives to devote their entire time to claim prevention problems. Prior to this action, which was effective the first of last year, the most noteworthy feature of claim prevention work was the freight claim prevention congress which was held at Chicago, Ill., November 15-16, 1920, with an attendance of 309 representatives of the various member carriers. As the immediate result of this congress the usefulness of the claim prevention organizations on many of the lines was extended, while on others where no such organization had existed, one was established and its course of operation directed advantageously by the Freight Claim Division. It is expected that a similar congress will be held at Chicago during the first part of this year.

Statistics of Freight Claim Payments

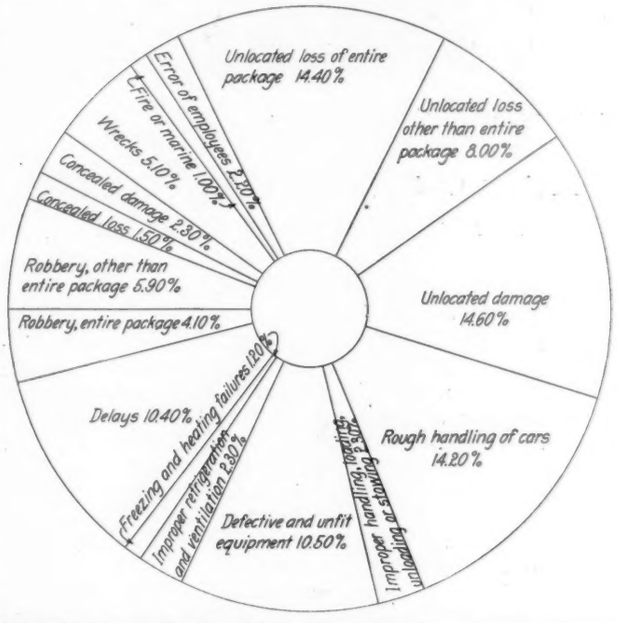
With the need of complete statistics of claim payments upon which to base its investigations, the subject of "uniform

Nails Pulled from Floors and Sides of Freight Cars Set for Loading at the Union Pacific-Oregon Short Line Freight House at Salt Lake City, Utah, from May 1 to September 30, 1921

claim statistics" was among the first considered by the Freight Claim Division committee after the amalgamation of the Freight Claim Association with the American Railway Association in 1919. Final and definite action was taken at the last annual session, when a special committee was created to prepare and promulgate to the membership a form for reporting monthly the claim payments of each carrier, separated according to the designated causes and commodities.

In accordance with this action the division's standard Form No. 1 came into existence and was made effective with the claim payments for the month of September, 1920, since which time the reports have been made monthly, and summaries thereof have been prepared and issued through the organization of the Committee on Cause and Prevention.

Prior to the inauguration of these reports the only compilation of claim statistics by causes and commodities was that prepared by the Interstate Commerce Commission on figures received from Class I railroads for 1914. With the exception of that period of one year, the carriers have not heretofore recorded their claim payments on any regular and uniform basis. The promptness, accuracy, and completeness with which these reports are now being rendered by the members are of the utmost assistance to the committee in directing its


Unlocated loss of entire package 14.40%
Unlocated loss other than entire package 8.00%
Unlocated damage 14.60%
Rough handling of cars 14.20%
Improper handling, loading or unloading of stock 2.30%
Defective and unfit equipment 10.50%
Improper refrigeration and ventilation 2.30%
Freezing and heating failures 1.20%
Delays 10.40%
Robbery, entire package 4.10%
Robbery, other than entire package 5.90%
Concealed loss 1.50%
Concealed damage 2.30%
Wrecks 5.10%
Fire or marine 1.00%
Error of employees 2.20%

Distribution of Freight Claim Payments According to Causes

work intelligently. Summories of these reports, accompanied by brief analytical statements pointing out the causes and commodities chiefly involved, with suggestions for preventive measures, are prepared monthly and distributed to railway officers, as well as to classification committees, weighing and

TABLE OF FREIGHT LOSS AND DAMAGE CLAIMS PRESENTED, PAID AND UNADJUSTED, AS REPORTED TO THE FREIGHT CLAIM DIVISION OF THE AMERICAN RAILWAY ASSOCIATION

Month	Number of carriers reporting	Total number claims received from claimants	Average number of claims received per carrier	Per cent increase or decrease in column 4 over Sept., 1920	Number claims paid to claimants	†Number claims unadjusted at close of month	Average number of claims unadjusted, per carrier	Per cent increase or decrease in column 8 over Sept., 1920
Sept., 1920.	165	295,590	1,791	...	246,600	404,729	2,452	...
Oct.	185	280,930	1,519	—15.1	239,792	416,579	2,250	— 8.2
Nov.	180	335,540	1,864	+ 4.0	297,434	548,097	3,044	+24.1
Dec.	180	315,272	1,752	— 2.2	305,557	511,624	2,842	+15.9
Jan., 1921..	228	305,816	1,341	—25.1	314,178	542,393	2,379	— 3.0
Feb.	230	198,657	864	—51.7	222,867	425,286	1,849	—24.6
Mar.	223	226,796	1,017	—43.2	243,929	408,629	1,832	—25.3
April	214	216,007	1,009	—43.7	244,889	380,909	1,780	—27.4
May	223	203,492	912	—49.1	229,315	347,419	1,558	—36.5
June	228	196,625	862	—51.9	214,915	312,680	1,371	—44.1
July	230	192,889	830	—53.6	199,864	305,075	1,326	—45.9
Aug.	228	208,404	907	—49.4	206,684	290,275	1,273	—48.1

*Embraces approximately 90 per cent of United States and 15 per cent of Canadian mileage represented in American Railway Association.
†Includes claims paid, but unapportioned among carriers.

inspection bureaus, and to interested divisions of the American Railway Association.

A claim prevention bulletin service was placed in operation the first of last year, the bulletins being sent to freight claim, freight claim prevention, transportation and traffic officers, chief special agents, freight agents, and others concerned in this work.

These bulletins serve to convey suggestions covering all phases of claim causes, and the methods for prevention as determined by existing practices developed through investigations of the Freight Claim Division. In addition to the bulletin service, separate action has been taken on a large number of important subjects which came up for immediate attention during the current year; circulars were issued to the membership covering such matters.

Public Not Neglected

The public has not been neglected in this claim reduction campaign. Those concerned in this work have been reached by conferences with commercial clubs, through special articles prepared for trade journals, associations and conventions, and by circulars to chambers of commerce and similar organizations. Definite ideas are presented to each individual group as to the best means of securing co-operation in the correct handling of freight.

The Freight Claim Division, in conjunction with the American Railway Express Company, inaugurated a "perfect package" campaign during the month of November, 1921. This was the first attempt for national co-operation between railroads, shippers, receivers and express people, for the purpose of studying the best ways of handling freight safely. The good spirit with which all concerned entered into this work, and the beneficial results which emanated from the campaign are considered by the division as a fair indication of the excellent outlook for co-operative claim prevention work with respect to the various other organizations interested.

The Lost Package Evil

Among the most recent activities of the Freight Claim Division is the national plan for controlling the lost package evil which was placed in operation the early part of last month. An eight-page circular was sent to the member carriers under the title "Uniform Method of Handling Over and Astray Freight and Matching Against Shorts at Destination Points." The committee on Freight Claim Prevention stated in this circular that for the first six months ending June 30, 1921, the unlocated loss of entire packages cost the carriers $8,039,572, or 14.4 per cent of the total claim payments. This sum added to the $2,285,601, charged during this period to robbery of entire packages, entails a total expenditure of more than $20,000,000 per year. The committee outlined in the bulletin detailed methods of making effective and uniform the present rules and practices, which to be successful, it believed, needed only the support of those in charge of supervision.

It is felt that the good results coming from the activity of the Freight Claim Division's prevention work are represented, not only by the increased number of committees formed on individual roads for the study of the causes of transportation failures, but also by the recent formation of a committee on freight claim prevention by the National Industrial Traffic League, which will be one of the means of bringing the organized shippers into an intensive study of the problem.

A plan to co-ordinate the activities of carriers to prevent damage to perishable freight, will also be placed in effect during 1922 with the co-operation of the National Perishable Freight Committee. Cut loss and damage in half—it can be done if the present enthusiasm and efforts may be taken as the indication of the future.

Improved Service and Morale Features of 1921

(*Continued from page* 48)

and to New York, 13 days. At present the schedule to Chicago is 8 days and to New York, 11 days.

Southern Lines

The Southern lines during the war were given considerably more traffic than previously because of the many training camps situated in the southern states. The southern lines, however, with few exceptions, made no changes in their fast freight schedules to northern points, although in many cases more time was taken to move the cars beyond the connecting points by connecting carriers in the north and east.

Morale and Service Interrelated

It is believed that this resumé of the changes that have taken place in connection with fast freight service show on the whole: (1) that service during the war was not up to pre-war standards; (2) that service after the armistice and during the latter part of the federal control period was exceedingly poor; (3) that the railroads in 1921 have made great strides towards returning to their former excellence and (4) that there is still some ground left to cover.

Somewhat the same thing has happened to morale. We will presume for the sake of argument that morale on the railways was good before the war. Following the same comparison as given for fast freight service, we may say: (1) that it was fair during the war, but not up to pre-war standard; (2) that after the armistice and during the second year of federal control it was exceedingly poor; (3) that the railroads in 1921 have made great strides towards restoring their pre-war excellent morale and (4) that there is still some ground left to cover.

Morale and excellence of service go together. The excellence of service creates morale and excellent service can only be secured through morale. A thing which brings us back to that old argument: Is competition really worth while on the railways? While it is recognized that exceedingly fast schedules will do more harm than good, there can be no question that competitive service of the proper kind is one of the best assets the railroads can have. The experiences of the past three or four years apparently emphasize this fact.

THE RAILROAD PROBLEM is still confused. Messrs. Kruttschnitt and Hines give conflicting impressions. They agree, however, upon this one thing: criticism, whether directed against the railroads or in behalf of the railroads, is far from being what it ought to be. Mr. Kruttschnitt, for the railroad managers, welcomes criticism—"preferably fair criticism, if it shows a reasonable respect for the facts." Mr. Hines, by his reference to the national agreements, shows what he thinks of a good many "facts" that come from the other side. The public finds itself lost in this dizzy play of billions of dollars. It, too, would welcome facts from an unquestionably authoritative and impartial source. It is a problem for somebody at Washington.—New York Evening Post.

Mandatory Rules Feature 1921 Accounting Progress

Effective January 1, 1922, New Rules for Interline Work Mark Taking of Important Step

By Charles W. Foss

THE LETTERS R. A. O. A. bear to railway accounting the same relationship that the letters M. C. B. bear to the railway mechanical department. In the past, this has been due to the position that has been held in the accounting field by the Railway Accounting Officers Association. Effective January 1, 1922, R. A. O. A. took on an additional meaning because on that date there went into effect the R. A. O. A. Mandatory Interline Accounting Rules and Forms.

These rules and forms are mandatory and binding upon all carriers operating in North America. The step to make them mandatory was taken at the annual meeting of the Railway Accounting Officers Association at Atlantic City last June. The recommendations that are made mandatory naturally include but a portion of all the recommendations or standard practices that have been formulated by the Association since its organization. Speaking generally, they include only rules or recommendations that have been established for some time, and have been tested out by several years of experience. Those rules not made mandatory still stand as recommendations only.

Prior to the action taken in June, or rather prior to the effective date of this action, namely, January 1, the rules of the Railway Accounting Officers Association relating to interline accounting—that is, accounting transactions affecting two or more carriers—were purely recommendatory. They, therefore, had no binding effect beyond the merit of the recommendations and the facility they gave to the transactions to which they related. Nevertheless, they had been generally adopted and had been generally in effect on all, or substantially all, carriers.

Provision for Arbitration

A feature of the mandatory rules is the provision for arbitration of disputes. This is a necessary part of the mandatory idea, but it has an additional importance in that the arbitration provisions fill a long felt want by establishing for the settlement of disputes, a procedure that is of a judicial nature.

The R. A. O. A. Mandatory Accounting Rules and Forms, as is to be expected, do not necessarily represent the final word. The rules take cognizance of the latitude essential for progress and the incentive necessary for the development of interline accounting. In other words, they have been arranged on a common-sense basis of permitting further progress and development. Presumably various of the present rules that are now recommendatory only will be added to the mandatory group, so that as time goes on, an increasingly large proportion of all the R. A. O. A. rules and forms will be made mandatory.

It is the opinion of many people well informed on the subject that this step represents the most momentous advance ever made in the history of railway accounting. This seems to be a rather strong characterization in view of the importance of the various steps that in the past had to be taken to bring American railway accounting up to its present preeminence. Nevertheless, there can be no question that January 1—the date the mandatory rules become effective—does mark the beginning of a new era in railway accounting.

The principle is well-recognized that the railways should render their accounts relating to interline business in a uniform manner. Such uniformity promotes fairness and impartiality and is a necessity insofar as concerns efficient and economical accounting among the carriers. It is a natural step to say, then, that uniform standard rules, impartially applied, constitute an integral part of inter-road accounting. It is further evident that conditions should not be allowed to continue which may make it possible for a carrier to deviate from an interline accounting rule according to the whim of the moment, or according to its interests in an individual case, while, under other circumstances, the same carrier may insist on making a literal application of the same rule when its interests lie in that direction.

Carriers Should Render Interline Accounts in Uniform Manner

Carrying the idea further, it hardly seems proper that a carrier is warranted in sending to other carriers statements or reports of a size and arrangement that do not conform to a generally accepted standard. Reports, statements, or other interline forms—if lacking uniformity of size and standardization of arrangement—are the source of additional labor and inconvenience in filing and using such reports, statements, or other interline forms by carriers receiving them. Some idea of the significance of this can be gleaned from the fact that the accounting department of a large carrier receives—from all other carriers—in the neighborhood of a million such forms each month.

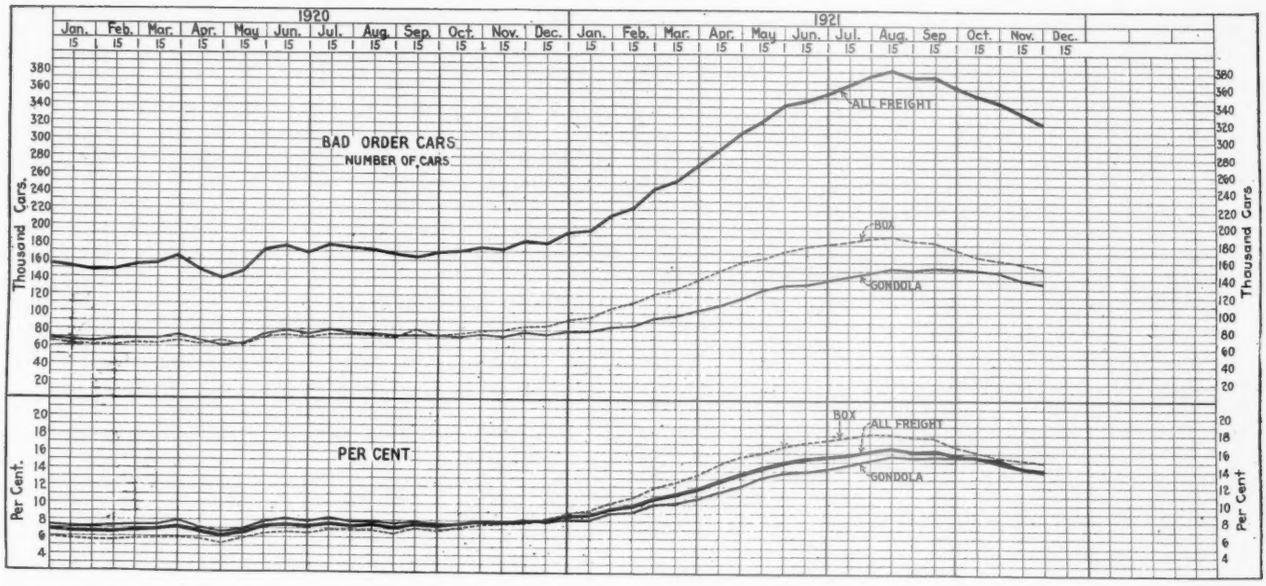
Standardization, as used in this connection, is synonymous with simplification. The saving of clerical work through standardization or simplification of forms will be obvious, to say nothing of the economy in printing usually attained by the use of standardized forms.

Relations With I. C. C.

The Interstate Commerce Commission has the power to prescribe railroad accounting in the most minute detail. The Commission has confined its accounting regulations principally to the accounting classifications, and the Commission has had the restraint, foresight and wisdom not to exercise its power in prescribing minute details of accounting, for the reason that action to that effect would bring irreparable damage to the railway industry by destroying the profession of railway accounting through reducing it to a mere matter of following minutely prescribed rules.

The accounting officer will probably express the opinion that the Commission is to be commended for having believed that carriers, individually and collectively, would voluntarily take adequate and effective action in respect to such matters, thus eliminating any necessity for action by the Commission. Whether it is the Commission that is to be commended or the Railway Accounting Officers Association, or both, is, of course, not the question. The fact is that the manner in which the two bodies have worked together and the excellent spirit of co-operation which has been shown on both sides are noteworthy.

Co-operation between the carriers is an equally important matter. To bring about uniformity in a matter such as these rules for interline accounting means sacrifices in individual cases, and it should be said—to the credit of the carriers—that they are making those sacrifices whole-heartedly and in ungrudging measure.



Bad Order Cars—Number and Per Cent

Equipment Conditions Show Dangerous Tendency

Low Earnings and High Prices Have Led to Small Purchases and Perpetuation of Old Rolling Stock

By A. F. Stuebing

IN ANY ANALYSIS of the equipment situation, there are two factors that at once command attention. The first is the large proportion of unserviceable equipment; the second, the small amount built. Both are unhealthy signs. In fact, the equipment record in 1921 is notable only as a horrible example.

Causes of the Bad Order Situation

So much has already been written concerning the abnormal number of bad order freight cars existing during the past year, that further comments might seem quite uncalled for. Nevertheless, it may be worth while to analyze the situation not as it concerns present problems, but rather with a view to its bearing on future conditions.

The year opened with bad order freight cars amounting to over eight per cent of the total. This was the greatest percentage ever recorded with the sole exception of the autumn of 1919 when it was over nine per cent. But these figures seem reasonable when compared with the record established during 1921 which was 16.6 per cent on August 15, as reported by the Car Service Section of the American Railway Association. Barring a recurrence of government control, it is doubtful whether this maximum will ever be exceeded, for the combination of circumstances that brought it about could hardly be duplicated. The majority of the bad order cars were a heritage from the policy of undermaintenance adopted by the Railroad Administration. At the beginning of last year the percentage of cars on the home lines was exceptionally small and as cars were returned to their owners many were found to be in defective condition and were set aside.

Even if the maximum repair forces had been employed, it would have been impossible to prevent a large increase in the bad orders under these circumstances. The condition was aggravated by several other factors. Many roads were not meeting operating expenses and drastic retrenchment was imperative. The number of car repairers decreased almost 50 per cent from October, 1920, to June, 1921. A considerable amount of work was deferred in expectation of reduced expenses for wages through reductions in hourly rates and abrogation of the national agreement and also for materials, the prices of which were constantly falling.

It is probable, too, that the bad order statements were, and still are, inflated by a very considerable number of cars which the railroads hope can be retired but which under present conditions must be set on side tracks and kept on the books because their retirement would involve a considerable charge to operating expenses which the railroads are not able to take care of at present. The statement of the Car Service Division of the American Railway Association for six months of the year shows that only 27,087 freight cars were retired in that period, the retirement being at the rate of only 54,000 cars annually. This is a smaller number than has been retired in any year recorded with the exception of 1919 when the Railroad Administration had adopted its policy of perpetuating weak equipment.

Few Freight Cars Replaced in Recent Years

An analysis of the equipment acquired and retired shows that in recent years the railroads have been following a policy of expediency in this regard which will bring disastrous consequences if it is not soon checked. During the years 1910 to 1914, inclusive, the Class I roads added an average of 134,316 freight cars to their equipment annually; from 1915 to 1920 the average annual acquirement was only 82,900 cars. The number of cars retired annually in the former period was 81,474; in the latter period, 72,399.

Studies have shown that the normal average life of freight cars is approximately 20 years. Twenty years ago the railroads were adding to their stock about 120,000 cars each year so at the rate of retirement that prevailed from 1915 to 1919 there remained each year about 50,000 more cars that had exceeded the normal expectancy of life. Looking at it from another standpoint, the average number of cars in the period, 1915-1920, was about 2,300,000. At the annual rate of retirement of 72,000 the average life of the equipment would be 31.8 years.

While the small number of retirements shows the tendency with respect to the replacement of freight equipment very plainly this is brought out in a more striking manner by the net change in the number of cars. From 1910 to 1914 there was an average annual net increase of 62,842 cars; from 1915 to 1920, the average annual increase was only 10,501. From these figures it is apparent that even though the capacity of the cars installed exceeded that of the cars retired, the net increase was by no means adequate to take care of the normal growth of business. The figures for last year, while incomplete, indicate that there has been an actual decrease in the number of cars, the retirements for six months exceeding the number installed by 719. The showing will be even worse when complete figures for the year are available. The acquirements are certain to be small for the report of September 30 showed only 2,142 freight cars on order.

There would be nothing alarming in the slight decrease in the number of cars that occurred last year if it were an isolated case. There have been periods of depression in the past when freight car equipment decreased, notably in 1909 when retirements exceeded acquirements by 15,298. However, in the years 1907 and 1908 the net increase in the number of freight cars was 193,355 and 100,580, respectively, and 1910 again brought an increase of 60,000 cars. The figures for 1921 have an untoward significance because they indicate the continuance of the unfavorable tendency of the preceding five years.

Past experience has shown that whenever traffic recovers after a period of depression, the volume of business exceeds all previous records. For six years there has been practically no growth in the freight equipment of the railroads. Population has not ceased to grow and commerce has not received more than a temporary check. There is reason to question whether an increase in business will not cause serious embarrassment to the railroads because of lack of cars.

There are some who contend that the railroads should take care of increases in traffic by improved utilization of cars rather than by increasing the amount of equipment. This argument is refuted by the serious car shortage of 1920, when the railroads were using their equipment more effectively than ever before. Even granting for the sake of argument that additional equipment is not needed, there is cause for concern when the rate of replacement of equipment over a five-year period is only 3.14 per cent a year.

New Equipment Would Effect Economies

The last report of the Interstate Commerce Commission for December 31, 1919, showed a total of 1,505,707 freight cars of all-steel or steel underframe construction. Of the remaining 855,000, probably at least 400,000 should be replaced with modern equipment to improve operation and reduce maintenance costs. The wages of car repairers have been increased more than almost any other class of employees and maintenance has gone up correspondingly. In 1920 the average cost of repairs per freight car was $257. Considering the variations between weak cars and well-designed cars as regards expenditures for repairs, transferring, switching, etc., the excess cost of maintaining and operating the old equipment may be considerably more than the fixed charges on new cars.

The majority of railroad officers apparently believe it is advisable to purchase additional freight cars as promptly as possible. The reason for the small orders and few retirements during the past year is to be found in the unfavorable financial condition. Retirement of cars generally involves a considerable charge to operating expenses; therefore, when earnings are low cars are set aside but kept on the books. During the time the cars are standing idle the depreciation reserve accumulates and the charge that must be made to the retirement account when the car is scrapped is gradually reduced. On the other hand as time goes on more cars are constantly coming due for retirement and the situation becomes worse. Failure to retire cars at the end of their normal life merely postpones the day of reckoning.

Are Higher Depreciation Rates Needed?

If depreciation rates were sufficiently high to make the depreciation reserve at the end of the normal life equal to the cost of the car minus salvage, there would be no charge to the retirement account. This might seem the ideal arrangement, but in practice most roads find it desirable to use a lower rate because it enables them to adjust expenditures more nearly in proportion to the revenues. If low rates are used one fact must not be overlooked. Insofar as the depreciation reserve is less than is actually required to retire the cars when due, and if retirements are less than normal, operating charges are reduced and earnings are inflated thereby. The last six or seven years furnish an illustration of how retirements may be deferred almost indefinitely. The inevitable result of such a policy will be deterioration of equipment. Roads that carry low depreciation rates are always tempted to postpone retirements in periods of low net earnings. During recent years expenses have no doubt been decreased in this way to the detriment of the equipment.

Locomotive Situation Continues Unsatisfactory

The motive power situation has been similar to the freight car situation, although conditions have not been as bad. As regards acquirements and retirements of equipment, the figures are also similar. From 1910 to 1914 the average number of locomotives installed was 3,451. From 1915 to 1920 it averaged only 1,939. This year the total number built was only 1,121. The net annual increase from 1910 to 1914 was 1,655 and from 1915 to 1920 only 488. For six months of 1921 the number of locomotives increased only 105.

Little Progress in Retiring Wooden Passenger Equipment

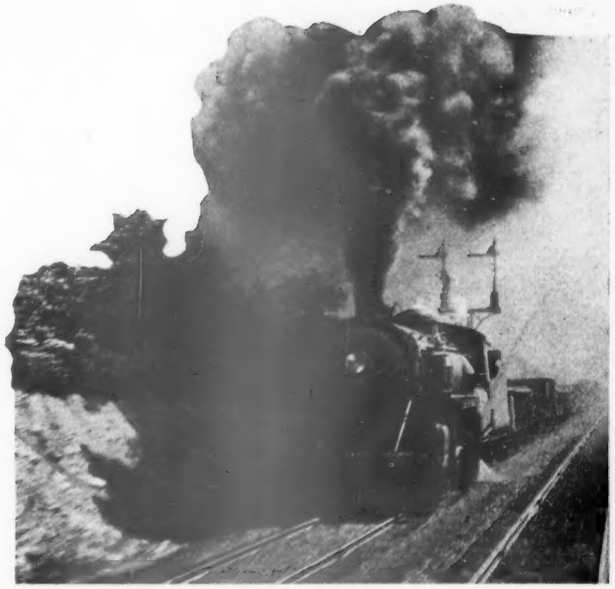
The additions to passenger equipment have likewise shown a remarkable decrease in recent years. The number of passenger cars installed from 1910 to 1914 averaged 3,453 a year; from 1915 to 1920 it was 1,583. The net annual increase in the former period was 1,713; in the latter period it was 301. The Interstate Commerce Commission's report for December 31, 1919, shows 53,765 passenger train cars on the Class I roads. The report of the Car Service Division for June 30, 1921, shows 53,884. In the 18 months the number of all-steel cars increased 1,059; the number with steel underframes increased 79. At this rate the remaining wooden cars will be replaced with steel or steel underframe equipment in about 41 years.

It is certain that the railroads made great progress toward putting their house in order during the past year. Many problems have demanded attention and equipment has been more or less neglected. Some of the other aspects of the railroad problem are becoming less menacing, but the equipment question is growing more serious. The solution cannot be put off until facilities are again taxed to the limit. Improvement can only come slowly; it should be started without delay.

Electrical Developments for the Year 1921

Definite Progress Has Been Made in Traction, Welding, Material Handling, Power and Lighting

By Alfred G. Oehler



Electric Operation Is Most Suitable Where Grades Are Heavy and Traffic Is Congested

DEVELOPMENTS in the electrical field made during the year have not been in the form of large installations of electrical machinery, but existing equipment has been made to perform new services and many new devices were brought out to meet new and changing demands. Electrical apparatus has been used to effect large economies and it would appear that some of the new devices will revolutionize existing practices. The electrical departments of the railroads and the manufacturers have responded effectively to the demand for economy and increased efficiency.

A lively interest has been maintained throughout the year in the subject of heavy electric traction, in spite of the fact that there has been no new application in this country.

The reasons for the interest and for the lack of new applications are quite simple. Railroad expansion has become largely a matter of intensive, rather than extensive, development. The number of new lines built has decreased steadily since 1906, and the present tendency in construction is to so arrange track as to get most efficient operation and greatest capacity. Electric operation affords an excellent means for increasing track capacity and for relieving congestion.

Many roads have electrification programs in view. Practically any electrification program must be considered as a major improvement involving the expenditure of large sums of money; that is probably the only reason why some of the contemplated work was not started. Twice during the year the Lackawanna has asked for bids on electrification apparatus. The program for the Illinois Central is, of course, definitely launched and that road recently purchased 20 new steel suburban coaches for use in steam service, but so designed that they can be equipped with motors and multiple-unit control apparatus.

IN SPITE OF the business depression, more than the usual amount of new and improved electrical equipment has been placed on the market.

It exemplifies the old adage about necessity. When devices prove inadequate or uneconomical, new ones are promptly developed to meet the new or increased demands. A return to normal conditions should permit the railroads to take advantage of the improvements that have been devised, with resulting increased economy.

Electric Traction in Foreign Countries

Electric operation for 11 eastern railroads was proposed in the report of the Superpower Survey (*Railway Age*, November 5, 1921, page 881) and it is highly probable that some of the roads mentioned in the report will electrify certain sections at some time in the near future.

In Europe many large electrification programs are underway. The scarcity of coal and the abundance of water power in these countries has materially hastened the adoption of electric operation. The programs for the various countries, which will be put into effect as rapidly as possible, are outlined in the table:

RAILROAD ELECTRIFICATION IN EUROPE (ROUTE MILES)

	In operation	Under construction	Proposed
Sweden	300	125	1,000
Norway	60	50	500
Germany	400	100	1,500
Austria	200	....	1,000
Switzerland	250	275	1,000
Italy	600	....	3,000
France	50	....	5,000
England	200	....	1,000
Holland	50	....	600
Belgium	....	....	500

Two important electrification contracts were given to American companies during the past year. One of these, amounting to $7,000,000, was let to the Westinghouse Electric International Company by the Chilean State Railways to cover equipment for 116 miles of main line and 144 miles of track. The other, amounting to more than $1,000,000, was let to the International General Electric Company by the Spanish Northern Railway and include about 40 miles of line. During the year both of these manufacturers have supplied equipment to the Central Railway of Paulista and a section of that road is now operated electrically. The same two companies have also supplied large amounts of electric railway material to Japan and to some of the European countries during the year.

Plans for electric operation have been made for railroads in the Philippines, Jamaica and Madagascar and it is expected that contracts will soon be awarded involving the electrification of about 90 miles of line in South Africa.

Notable development work has been done which has greatly improved the operation of automatic substations, and a number of such installations have been made during the

year. These have all been made for power and street railway companies, but it is highly probable that such substations will soon find a place in trunk line railroad service.

Electric Welding

Electric arc welding during the past year has been used successfully in repairing a considerably greater variety of parts than ever before. Some of the more recent applications are listed in the table:

APPLICATIONS OF ELECTRIC ARC WELDING

1. Cast Steel Wheel Centers.
2. Cast Iron Wheel Centers.
3. Application of Hub Liners.
4. Building up Tires on Wheels.
5. Couplers.
6. Coupler Knuckles.
7. Truck Sides and Bolters.
8. Draft Castings and Car Sills.
9. Side Plates and End Plates.
10. Building up Worn Crossings, Frogs and Switches.
11. Erecting Iron and Steel Structures, Including Tanks.

The table lists only a small part of recent applications and is presented to show the trend in the use of arc welding. Few roads use all of the practices listed, but it will probably be only a matter of time before they will be used generally.

Large savings can be made by the use of autogenous welding, both electric and gas, and that will, of course, cause its use to be extended as rapidiy as the users can learn how to obtain dependable welds. It has been shown that an investment of $150,000 in welding equipment on the Rock Island has in a few years saved three times its cost. After the practice of welding locomotive tires was established, no new tires were purchased for a period of three years, and the number now bought is only about one-third of the former average.

Electric resistance welding will probably come into much greater use than at present for safe-ending boiler tubes. The committee of the Master Boiler Makers' Association on Methods of Welding Safe Ends on Locomotive Boiler Tubes made the following statement in its last report: "Welding safe ends by the electrical welding machine, in the opinion of the committee, will eventually supersede the present method."

Rivet heating cannot be classified as welding, but as a closely allied work it should be said that electric rivet heaters have proved their economy and usefulness and are rapidly finding favor in boiler, tank and car shops.

Practically all of the manufacturers of welding machinery have made improvements in their equipment. Among the outstanding developments is the so-called semi-automatic welding lead which has been applied to the General Electric automatic welder. It consists of a 10-foot length of flexible steel tubing, equipped at one end with an adapter for attaching it to the automatic head; and at the other end with a guide nozzle to direct the electrode wire to the arc. This device combines the advantages of a steady supply of wire and constant arc length of the automatic welder with that obtained by allowing the operator to direct the arc manually.

Several new gas-engine-driven welding sets have been designed for use in places where electric power is unavailable or where it is inconvenient or costly to bring it to the work.

Marked progress has also been made in percussive welding and for certain purposes it has been shown to be the quickest and most efficient method.

Alloy steels have been welded successfully by the electric arc process, and with adequate mechanical and heat treatment, tensile strengths of the weld of 130,000 lb. per square inch have been secured.

Electrical Devices for Handling Material

Two new types of electric crane trucks were developed during the year which will probably find a wide application. These have a capacity of 3,000 lb. and have a boom long enough to lift an air pump or front end into position on a locomotive. They are designed for use in enginehouses and similar places where an overhead crane is not available and have the added advantage of being able to carry material from one building to another, as from the storage platform to the repair shop.

They are being used by the Western Maryland and the New York Central. In describing their usefulness, M. E. Towner, general purchasing agent, Western Maryland, writes:

"Electric crane trucks are being installed on a regular tour of duties, including routing through shops, with loading and unloading stations marked where material is unloaded or assembled. Air pumps are taken from the side of a locomotive; and in one instance the operation of taking down an air pump, delivering to repair point and bringing back an extra pump, consumed 21 minutes, as against one and one-half hours for the operation by former methods. Another operation was the handling of side rods and equally heavy material in 30 minutes as against previous four hours' operation. This tour of duties includes from a one-day ahead program to a 30-day ahead program in conjunction with the shop heavy repair program."

The successful operation of tractors and trailers in freight transfer service was particularly well demonstrated by an installation on the New Haven at the Cedar Hill transfer, where 14 tractors are used. One hundred and thirty-one distinct classifications are made daily and as many as 305 cars have been worked in one day, a normal daily performance being between 260 and 285 cars. The ability of the transfer to work this number of cars, with tractors and trailers, has resulted in the closing of the transfers at Westchester and Maybrook permanently. Furthermore, approximately 80 per cent of the transfers at Bridgeport and Hartford and 50 per cent of the transfers at Waterbury, Danbury and Poughkeepsie, have been eliminated through the concentration of the transfer business on the west end of the line.

Motors and Control Devices

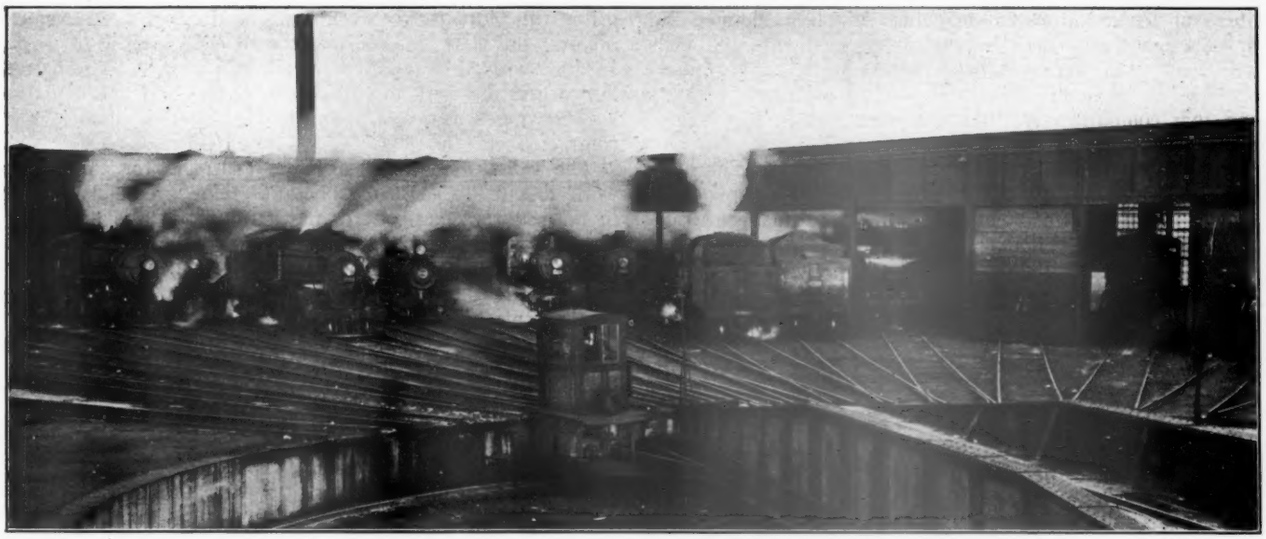
A remarkably large number of switches and switch controls have been developed during the year. Most of these were designed principally for the sake of safety and convenience. The old open-type switches are being rapidly displaced by those which are fully enclosed. Automatic starters have been developed for synchronous motors.

In the application of electric motors to shop machines, there have been two developments of note. One is the application of "built in" high-speed induction motors to various wood-working machines, grinders and other machines which require high uniform speeds; and the other is a new form of direct-connected, reversing-motor drive for planers. The new planer drive was developed to overcome troubles caused by planers over-traveling from any one of several causes.

Lighting

The most notable developments in lighting for railroad service have been in yard and enginehouse lighting. Detailed methods have been worked out by the Lighting Service Department of the Edison Lamp Works of the General Electric Company for using flood lights for night illumination of classification yards, scale houses and turntables, and these methods have been applied with excellent results.

Enginehouses are now lighted on the Boston & Albany, the Lehigh & Hudson and Chicago & Northwestern by mounting two floodlights with crossed beams on the outer circle wall between each stall. This method does not solve all of the wiring difficulties of enginehouse lighting, but it simplifies them and supplies effective lighting. It represents a big step in the right direction.



Repair Shop and Enginehouse Developments

Few Additional Facilities—Contracted Work and Leased Shops—Future Possibilities

By E. L. Woodward

RELATIVELY FEW additional facilities either in new railroad shops and enginehouses, or more modern equipment for those already built, were provided during the year 1921. Repair work was let out on contract, some shops were leased and others closed, and yet there is reason to believe that railroad shops will come into their old position of importance again in 1922. The Labor Board has already abrogated most of the efficiency-destroying rules promulgated during the Railroad Administration and has removed the inhibition against piecework. Wages are being considered and will undoubtedly in the long run be adjusted to the level of those paid for similar work in adjoining territory, thus placing railroad shops on a more even basis with the contractors.

Difficulty in obtaining capital was one of the factors that retarded shop improvements in 1921. Now money is easier, net earnings are on the increase, and many railroads have already developed ambitious improvement programs. Eighty replies to a questionnaire recently sent out to Class I railroads showed that many individual shop and terminal projects, costing anywhere from $200,000 to $3,550,000, are contemplated. These projects each call for machine tools and shop equipment costing from $20,000 to $948,000, so it is plain that the majority of railroad men are awake to future needs, and improvement programs will be carried out in 1922 to an extent depending upon financial considerations and the rapidity with which business and traffic pick up.

A QUESTIONNAIRE was recently sent to the Class I railroads; 80 replies received show that many individual shop and engine-house improvement projects, costing from $200,000 to $3,550,000, are contemplated.

Extensive lists of shop machinery and equipment are in the respective budgets and in some cases orders have already been placed against these lists.

The extent to which improvement programs are carried out in 1922 will depend upon how quickly business picks up.

No big shop construction programs were undertaken in 1921 and the general condition of the railroads as regards ability to maintain locomotives and cars in good repair and running condition is not better than it was a year ago. In fact, at many points the facilities for handling general and running repair work are naturally less effective than before because of depreciation and because the railroads have been unable, for financial reasons, to make needed replacements or additions and betterments.

It is true that there was little agitation for greater shop capacity during the past year because of the fact that the railroads were able to handle the reduced traffic with little or no difficulty. This does not prove that shop facilities are in any way adequate or up to the point which would be necessary to furnish power for even a normal traffic. One has but to visit any average shop and see the old, worn-out machinery and equipment which railroads are compelled to use through lack of funds, to be convinced of the imperative need not only of additional shops, but of more modern, productive machinery in those already built.

No modern business would be able to meet a competitor's prices if it depended for production on machinery which had long since outlived its usefulness. Fifty years ago, for example, it was quite common to ornament the cross rail or housings of a planer with acorns or other artistic designs and yet these "acorn" planers are found all too frequently in railroad shops at the present time. The cost-

liness of using antiquated machines has been pointed out times without number. No one acquainted with the facts will deny that many railroad shops were badly underequipped as to modern machinery at the beginning of 1921 and that comparatively little was done during the year to relieve the situation.

Replies to the questionnaires indicated that in some cases 1921 programs, not fully carried out, will be completed in 1922. Certain railroads, for example, were unable to purchase necessary new boilers and air compressors for power houses and these will now be secured. It is also planned to install automatic stokers with a view to increasing power plant capacity and efficiency. Other roads reported that extensive programs of improvement are under way but not settled as to details. The questionnaires showed that railroads realize the necessity for greater shop and enginehouse facilities as a means of getting the maximum service from equipment and keeping the proper relation between rolling stock and shop capacity. The need for modernizing existing power was also strongly emphasized and it developed that modernizing programs are now being delayed for lack of shop facilities to carry them out. In view of the need for improvements in railroad shops and enginehouses and the reasonable ground for belief that at least some of these improvements are on the way, it will be interesting to note what is actually accomplished along this line in 1922.

Much Repair Work Done on Contract

One of the most noticeable developments in the past year was the increasing tendency to let out repair work to contractors and lease both shops and terminals to contractors or local companies organized for the purpose. In view of the importance of this step, it may be well to analyze the reasons for it and some of its advantages and disadvantages.

The contracting of repair work is by no means new and has been common to a greater or less extent on railroads for many years. It is only recently that objections to this practice have been taken by national labor leaders in an effort to discredit the managements in the eyes of the public by claiming that the real purpose was to disrupt labor organizations or secure graft. The railroads refused to be put on the defensive as to either of these two charges of which they must justly be considered innocent until proved guilty.

There are two sound reasons why it has been necessary for the railroads to have a considerable proportion of repair work, particularly on cars, done by outside contractors. The first of these reasons is lack of shop facilities to handle normal repair work and the second is the possibility of reduction in cost up to 25 per cent after allowing a reasonable profit for the contractor. Railroad men anticipated difficulty in handling traffic in the early months of 1921 due to a severe winter which did not develop and an increase of business which did not materialize. To insure that traffic would not be delayed it was felt that locomotives and cars should be placed in the best possible operating condition and inasmuch as existing railroad shops were not able to handle all this work, a great deal of it was given to contractors. Had the railroads foreseen the mild winter and rapid decrease in traffic it is probable that less repair work would have been contracted, but, as in many other cases, hindsight is always better than fore-sight. Had business returned to normal more quickly with the railroads unprepared to handle it, they would have been severely censured.

With present wages, and the working conditions in force up to December 1 in railroad shops, private contractors with plants in the same localities could handle repair work, pay the cost of moving equipment and needed material, add a profit of 10 per cent, and yet repair the cars at approximately 25 per cent less than when the work was done in local shops. It is the duty of the managements to operate the lines as efficiently and economically as possible and in fulfilling this duty repair work must be done in a way which involves the least cost consistent with good quality of work. In line with this policy the railroads had no alternative but to give the work to outside contractors and this explains why so much car and locomotive maintenance work was contracted out in 1921.

The railroads were able to let contracts for car repair work to outside companies because there are many plants in the country equipped for the handling of this particular kind of work. These plants specialize in the building and repair of equipment and have both the facilities and organization to handle it efficiently. In maintaining locomotives on the contrary, except for the big locomotive builders, few shops are equipped with cranes and machinery for handling strictly locomotive repair work and the builders themselves, while physically equipped to handle the work, are more or less unfamiliar with the process of stripping and distributing locomotive parts to the various departments for repairs. In a test case, three or four locomotives were sent to each of three locomotive builders and it was maintained that they were repaired at a loss as contracted. There are a few small industrial locomotive repair shops in the country, but these are entirely inadequate in number and equipment to handle ordinary repair work.

Essential Reasons for Leased Shops

There are many reasons justifying the leasing of repair shops. In the first place, it is a question of relative costs, the advantage being in favor of the contractor or lessee who is not hampered by outside interference, settles local grievances quickly, pays prevailing rates of wages and increases production by installing piecework or some other method of paying men in proportion to output. Another fact to be considered is that an idle plant always deteriorates faster than one in operation which is properly cared for. It is therefore an advantage to have shops operated, even by outside parties, rather than to have them idle. In addition, the operation of these plants will keep repairmen of ability in the locality available for use when the shops are again operated by the railroads. It is estimated that 60 per cent of the men will thus be available for re-employment. In most cases the shops are leased under contracts terminable on comparatively short notice and the idea is that when the Labor Board removes the handicaps formerly placed on shop managements and adjusts wages to the level paid in other industries the railroads will again be able to take over their own plants and secure economical operation.

Piecework and Shop Production

There must be an entire reversal of attitude on the part of many railroad shop employees regarding production and what constitutes a fair day's work if this tendency to contract repair work and lease shops is to be overcome. It is obvious that where costly rules and disproportionate wages are responsible for turning repair work over to contractors the rules must be changed and wages adjusted. Otherwise repair work will never be brought back to the railroad shops where it belongs. Under recent rulings of the Labor Board most of the objectionable rules have been changed, wage adjustments are being considered and it is therefore up to the shop workers to decide whether or not they will increase their efficiency to a point equal to or greater than that of workers for private contractors.

It is an unfortunate fact that every industrial organization harbors at least a few men who are determined to do as little as possible for the individual or company employing them. The only method to handle these men is to pay them in proportion to their output by the installation of piecework or some such wage payment system based on individual effort. Piecework systems have been used in practically all branches of repair shop work and have been

satisfactory to the majority of workers by affording increased pay, and to the railroads by increasing shop output. Many of the contractors have used the old piecework rates developed on the railroads and in certain cases railroad shops have reopened because of the piecework method of payment being adopted by a majority of the men. It seems probable that one answer to the present railroad shop problem to be worked out during 1922 will be the further and more general use of piecework systems.

A Good Time to Install Shop Schedules

The reasons why the expression "shop schedule" is synonymous with orderly work and good production have been explained many times in these columns and are well-known to railroad men. During the year, labor problems received almost the exclusive attention of mechanical department officers and the use of shop schedules or routing systems was not extended to any considerable number of shops. In fact, owing to the decreased need of maximum shop output, scheduling as a means to this end was not as necessary as formerly. It is safe to say that the time will come, however, when shops will again be taxed to their capacity and this time may be sooner than some expect. The present affords a splendid opportunity to develop shop scheduling systems in those shops not already benefiting by their operation. The result will be that work will be arranged in the order of its importance, detail repair parts kept moving and finished in time for assembly, material ordered in advance to be on hand when necessary, and locomotives and cars turned out in a minimum length of time with a resultant desirable effect on railroad earnings.

Engine Terminal Developments and Needs

Owing to reduced traffic during 1921, there was not the usual incentive to provide greater terminal facilities and increase the efficiency of terminal operations. Additions and improvements to existing terminals were made, in many cases, however, and several new terminals, built by the contractors, are now ready to be turned over to the railroads for operation.

It is interesting to note the greater attention being given to the machine tool equipment of enginehouses, and in spite of the difficulty in getting appropriations many antiquated machines have been replaced by new ones. This practice is in line with sound business policy because any expenditure which will speed up the handling of locomotives at terminals will show immediately in increased revenue tonnage movement per locomotive.

The old idea that any machine that will run is good enough for a roundhouse has long since been out of date and railroad men are coming to see that not only should roundhouses be equipped with modern productive tools, but these tools should be of sufficient number and capacity to handle heavy running repairs. With a roundhouse under-equipped, this work must be handled at the back shop where its injection into general repair work always results in a disorganized schedule and decreased production.

Cranes and Material Handling Devices

The range of work handled at big terminals varies almost as much in kind and quantity as that handled at back shops and many mechanical hoists have been installed for the handling of heavy locomotive parts. The modern tendency in every industry is to reduce the manual labor involved in handling either finished parts or raw material and in line with this policy is the growing feeling that terminals and large roundhouses should be equipped with traveling cranes, of probably not less than 15 tons capacity, to handle any locomotive part except the boiler. These cranes have already been installed at some terminals with good results.

Existing roundhouses could not be equipped with traveling cranes without being practically redesigned, including in most cases strengthening the walls, and the result is that the cost probably would not warrant the installation of traveling cranes except in new, large roundhouses where much heavy running repair work is to be handled. The proper location of jib cranes, however, will do much to facilitate the handling of heavy parts and these cranes can be installed at a nominal cost.

Power-operated trucks are coming into much more common use not only in shops but roundhouses and there are many ways in which these trucks prove of value. They are used not only for the transportation of material either directly or on trailers, and with a great saving in labor, but often they can be jockeyed into position and used to push or pull heavy wheels and other parts which would require the efforts of several laborers to move. The power-operated truck, equipped with a swinging crane is particularly valuable in shops or roundhouses and saves many hard lifts.

Ash Pits and Coaling Stations

The problem of coaling locomotives and handling ashes is ever present at terminals where coal-burning locomotives are turned. While many of the smaller terminals especially are required to handle ashes, either in part or in whole by hand shoveling, this costly work is being eliminated as fast as appropriations can be obtained to finance improvements. Gantry cranes and grab buckets have demonstrated their superiority for performing this work and no modern terminal, turning any considerable number of locomotives, can be operated without these facilities. At many small terminals the installation of mono-rail pneumatic hoists and buckets has helped to relieve the situation.

It is essential that all coal and ash handling equipment be periodically inspected and kept in good repair so that locomotive delays due to break-downs may be avoided. The result, for example, when the hoisting machinery in a coaling plant goes out of commission, can well be imagined. Coal cars are brought up, either a crane or hand shovelers hunted up and, in spite of the most strenuous efforts, locomotives are usually delayed and trains tied up.

Enginehouse Personnel Most Important

As with other departments of railroading and all branches of industry, the human element is most important. Even with a modern plant and the best machinery and equipment that money can buy, no terminal can be operated efficiently or satisfactorily with incapable or discontented men. This attitude of the men is so largely dependent upon the character and ability of their immediate supervisory officers that the utmost care should be taken to develop and select able men for these positions. To their great credit be it said that many roundhouse foremen, while modestly and effectively performing daily duties during the past year were able to inspire their men with respect and confidence and never experienced difficulty in getting workmen to undertake tasks which they could legally have refused to do owing to technical rules. It was a case of leading and not driving, coupled with fairness in all relations between foremen and men.

One reason why certain terminals are more efficiently operated than others is because their foremen and supervising officers have recognized the need of trained forces, each workman being instructed in his particular task until he fully understands what should be done and knows how to do it. Responsibility for inspection and repair is fixed and this insures that locomotives have the proper, careful attention each time they come to the terminals. Defects are thus discovered in time before serious wear or accident has occurred. It is not maintained that all terminals, or even 25 per cent of them, are operated in this manner, but the few that are demonstrate the possibilities and present an example which can well be followed by others.

Chronological Review

A Resumé of the Outstanding Events of the Twelve Months, Arranged for Ready Reference

By J. E. Cole

THE PAST YEAR has been marked by a constant effort for readjustment of railroad conditions by railway officers, the state and national commissions, the shippers and the general public. The railroad problem has, as never before, become the people's problem. But despite the widespread publicity given to railway conditions, the progress toward readjustment has been slow. The roads have experienced a year of decreased business, with the costs of materials and wages decreasing relatively little, while they have been fettered by prolonged investigations and hearings on rates and wages. However, the roads have demonstrated the economic advantages of private operation by the increased efficiency of operation and economy of management which they have been able to effect and they have come forward with a number of voluntary rate reductions which are in effect as the year closes. With these conditions in mind, the following list of the outstanding developments and decisions of the year has been compiled:

LABOR BOARD in almost continuous session on adjustment of wages and working conditions.

Congress gave much attention to railway problem.

Numerous reductions in rates put into effect late in year.

Labor difficulties culminated in threatened strike which was called off at the last minute.

JANUARY

January 1, 1921.—Section 10 of the Clayton act regulating dealings in railroad securities and supplies between companies having "interlocking relationship" became effective.

January 5.—Hearings on the Frelinghuysen bill offered as a substitute for Section 10 of the Clayton act began before a sub-committee of the Senate Committee on Interstate Commerce.

January 6.—Winslow bill introduced in Congress to provide for partial payments to railroads for deficits incurred during the guarantee period.

January 6.—Interstate Commerce Commission announced that a formal investigation would be made of the charges made by representatives of railroad labor organizations that certain railroads were paying excessive prices for the repair of cars and locomotives.

January 10.—Hearings on national agreements and working conditions began before Labor Board.

January 28.—Interstate Commerce Commission rendered decision making interstate rates effective in Illinois for intrastate rates.

January 28.—Atlanta, Birmingham & Atlantic petitioned Labor Board for authority to reduce wages.

January 31.—Labor committee of the Association of Railway Executives suggested to Labor Board that it set aside at once all rules and working conditions imposed since December 31, 1917.

January 31.—Winslow bill reported favorably to the Senate by the Senate Committee on Interstate Commerce.

FEBRUARY

February 6.—President Wilson declined railroad employees' request that he interfere in the controversy over the abrogation of the national agreements.

February 8.—Winslow bill passed by House.

February 14.—Labor Board directed Erie to rescind wage cut and ruled that no change in wages or working conditions was to be made except by agreement between the parties, until the dispute was heard and opportunity given for the Board to pass upon it.

February 17.—Labor Board rendered decision setting forth procedure to be followed in handling matters over which it has jurisdiction.

February 21.—Labor Board remanded wage reduction disputes of the Atlanta, Birmingham & Atlantic and the Missouri & North Arkansas to parties involved.

February 22.—Winslow bill passed by Senate.

February 22.—Milton H. Smith president of the Louisville & Nashville, died at Louisville, Ky.

February 25.—Atlanta, Birmingham & Atlantic thrown into receivership and B. L. Bugg, president of the road, appointed receiver.

February 26.—President Wilson signed Winslow bill.

February 27.—Missouri & North Arkansas employees struck following a reduction of wages by the receiver of the road.

February 27.—New York Central-Michigan Central wreck at Porter, Ind.—37 killed.

February 28.—Forty-two state commissions filed briefs with Supreme Court denying power of the Interstate Commerce Commission to fix intrastate rates.

MARCH

March 3.—Treasury department made first payments under Winslow bill.

March 4.—Labor committee of the Association of Railway Executives abolished, following decision that individual roads would henceforth handle labor questions directly with the employees.

March 4.—John Barton Payne retired as Secretary of the Interior and Director General of Railroads.

March 5.—Atlanta, Birmingham & Atlantic employees struck following wage reductions. Road came before Labor Board to justify reduction in wages.

March 14.—Railway executives summoned by Labor Board as witnesses in hearing on abrogation of national agreements.

March 15.—National Industrial Traffic League filed petition with Labor Board for a hearing in national agreements controversy.

March 15.—Hearings of the New England governors' committee started inquiring into the railroad situation.

March 17.—Wible L. Mapother elected president of the Louisville & Nashville.

March 19.—Chicago & North Western grain elevator at Chicago destroyed by dust explosion. Six people killed and loss estimated at $4,000,000.

March 24.—President called conference with the chairman of the Interstate Commerce Commission and the chairman of the Labor Board on the wage and rate situation.

March 25.—Missouri & North Arkansas suspended operation.

March 25.—John J. Esch appointed recess member of the Interstate Commerce Commission.

March 25.—S. Davies Warfield filed a plan of railroad administration with Senate Committee on Interstate Commerce in behalf of the National Association of Owners of Railroad Securities.

March 26.—President Harding appointed James C. Davis director general of railroads.

March 29.—Labor Board denied petition of the National Industrial Traffic League for hearing in national agreements controversy.

APRIL

April 4.—National Association of Owners of Railroad Securities met with representatives of "Big Four" brotherhoods to discuss railroad situation.

April 4.—Final valuations served on the Kansas City Southern, the Los Angeles & Salt Lake, the Atlanta, Birmingham & Atlantic and the Winston-Salem Southbound.

April 12.—President Harding, before Congress, declared railway rates and the cost of operation must be reduced.

April 12.—Senator Cummins introduced resolution in Senate providing for investigation of railroad situation.

April 14.—Labor Board ruled national agreements were to end on July 1.

April 19.—Senate ordered investigation of railroad situation by the Senate Committee on Interstate Commerce.

April 19.—Joseph H. Young elected president of the Denver & Rio Grande Western.

April 21.—Labor Board ruled Atlanta, Birmingham & Atlantic wage cut was illegal.

April 25.—Senate confirmed appointment of B. W. Hooper, S. Higgins and W. L. McMenimen, as members of the Railroad Labor Board to succeed H. W. Hunt, W. L. Park and J. J. Forrester, respectively.

April 28.—Railroad employees began fight against the wage reductions asked for by the railroads.

April 29.—Governor's committee opposed rate raise in New England.

MAY

May 3.—Senate confirmed appointments of E. I. Lewis and J. B. Campbell to Interstate Commerce Commission.

May 7.—Railroads completed plea for first wage reduction before Labor Board.

May 10.—Senate committee began investigation of railroad situation.

May 12.—George R. Loyall elected president of the Norfolk Southern.

May 16.—Seasonal coal rate bill reported favorably by Senate committee on Interstate Commerce.

May 18.—Franklin K. Lane, former member of the Interstate Commerce Commission, died at Rochester, Minn.

May 22.—Edward L. Brown, formerly president of the Minneapolis & St. Louis, and the Denver & Rio Grande, died at St. Paul, Minn.

May 25.—Union Pacific acquired full control of Los Angeles & Salt Lake by purchase of holdings of Senator W. A. Clark and friends.

May 25.—Henry B. Ledyard, chairman of the board of directors and former president of the Michigan Central, died at Detroit, Mich.

JUNE

June 1.—Labor Board ordered wage reduction approximating 12 per cent, effective on July 1, in order No. 147.

June 3.—Pueblo, Colo., flood caused $5,000,000 damage to railroads.

June 6.—National Association of Owners of Railroad Securities appointed committee to study railroad problems.

June 6.—Carriers asked Labor Board to reduce wages to the rates existing prior to Decision No. 2 of the Labor Board.

June 17.—Labor Board decided against Pullman Company which sought to bring a plea for wage reductions before Board. Ordered to go to employees and then to Board.

June 18.—Edgar E. Clark, re-elected chairman of the Interstate Commerce Commission.

June 27.—Labor Board extended scope of wage reductions, adding 92 carriers and one labor organization as parties to wage reduction order Decision No. 147.

June 28.—Labor Board continued national agreements until such time as rules are considered and decided by the Labor Board.

JULY

July 1.—Wage reductions totaling 12 per cent of pay roll became effective.

July 1.—Numerous changes in car service rules became effective.

July 1.—New classifications of railroad employees were made effective.

July 3.—John Findley Wallace, consulting engineer and chairman of the Chicago Railway Terminal Commission, died at Washington, D. C.

July 8.—Charles A. Prouty, director of valuation and former member of the Interstate Commerce Commission, died at Newport, Vt.

July 14.—Representatives of Pennsylvania Railroad appeared before Labor Board defending employee representation plan of the company.

July 16.—Charles F. Staples appointed acting director of valuation of the Interstate Commerce Commission.

July 22.—Railroad settlement plan providing for the

funding of the debt of the railroads to the Railroad Administration, announced by the President.

July 22.—Edgar E. Clark resigned as a member and chairman of the Interstate Commerce Commission. Frederick I. Cox succeeded Mr. Clark as a member of the commission.

July 28.—Interstate Commerce Commission declined to fix New England rate divisions.

AUGUST

August 1.—Reorganization of Car Service Commission of the American Railway Association became effective.

August 1.—Labor Board ordered new election of repsentatives of employees on the Pennsylvania to negotiate new rules and working conditions.

August 1.—U. S. Chamber of Commerce appointed two committees to deal with transportation.

August 6.—Interstate Commerce Commission prescribed method for fixing operating expenses for maintenance during the guarantee period.

August 9.—Hearings began before Senate Committee on the Townsend bill which would allow War Finance Corporation to purchase obligations of the carriers.

August 11.—Roads refused "Big Four" brotherhood's demand that wages be restored to the level of June 30.

August 15.—Interstate Commerce Commission decided that freight rates on live stock should be reduced in western territory.

August 16.—Overtime controversy settled by Labor Board with compromise decision containing seven new rules to govern punitive payments.

August 22.—Epes Randolph, president of the Southern Pacific of Mexico and the Arizona Eastern, died at Tucson, Ariz.

August 22.—House passed railroad funding bill.

August 24.—Pennsylvania Railroad denied right of Labor Board to regulate working conditions.

SEPTEMBER

September 12.—Sale of equipment trust certificates by the director general of railroads started.

September 24.—Labor Board defined its powers and legal status.

September 25.—H. P. Titcomb elected president of Southern Pacific of Mexico and the Arizona Eastern succeeding Epes Randolph, deceased.

September 28.—Interstate Commerce Commission presented tentative consolidation plan, proposing 19 competing systems.

OCTOBER

October 3.—Charles C. McChord elected chairman of the Interstate Commerce Commission.

October 11.—Unemployment conference urged railway rate revision.

October 11.—State commissioners at Atlanta, Ga., debated federal vs. state regulatory powers.

October 13.—Labor Board lifted piece-work ban.

October 14.—Association of Railway Executives decided to ask Labor Board for further wage reductions.

October 15.—Labor leaders called strike of train service employees for October 30.

October 15.—President conferred with public group of the Labor Board on strike situation.

October 22.—Trainmen of the International & Great Northern struck as "opening gun" despite instructions of Labor Board to await decision of October 26 conference.

October 22.—Interstate Commerce Commission ordered western grain and hay rates reduced.

October 26.—Labor Board held inquiry on the threatened strike.

October 27.—Threatened strike called off.

NOVEMBER

November 1.—Nation-wide "Perfect Package Month" campaign opened.

November 1.—Labor Board recognized "ability to pay" as "secondary" factor in fixing wages in determining wage scales.

November 3.—Erie freight piers at Weehawken, N. J., destroyed by fire with loss of $2,000,000.

November 14.—Hearings on Capper bill which proposes amendment of Transportation Act began by Senate Committee.

November 16.—Association of Railway Executives passed a resolution providing for a petition to be filed with the Interstate Commerce Commission asking that the Commission announce its rate policy, and announcing a 10 per cent reduction in rates on all agricultural products which it was expected would be substituted for the reduction in western rates on grain and hay.

November 23.—Interstate Commerce Commission ordered general rate inquiry.

November 29.—Labor Board announced complete new rules to supersede the provisions of the Shop Craft's National Agreement, to be made effective December 1.

DECEMBER

December 1.—United States Shipping Board asked railroads to abrogate the foreign shipping line contracts at hearing before committee of that body.

December 5.—Arguments started before the United States Supreme Court on the bill filed by the state of Texas attacking the constiutionality of the Transportation Act.

December 5.—Collision on the Newton branch of the Philadelphia & Reading, at Bryn Athyn, Pa.—25 persons killed, 20 injured.

December 14.—Interstate Commerce Commission began general rate investigation, to determine whether and to what extent further rate reductions are justified.

December 14.—Labor Board announced new code of working rules for maintenance-of-way employees, providing that punitive overtime be allowed after ten hours instead of eight.

December 19.—Labor Board opened hearing on the right of the railroads to contract locomotive and car repair and maintenance of way work.

Foreign Railways Section

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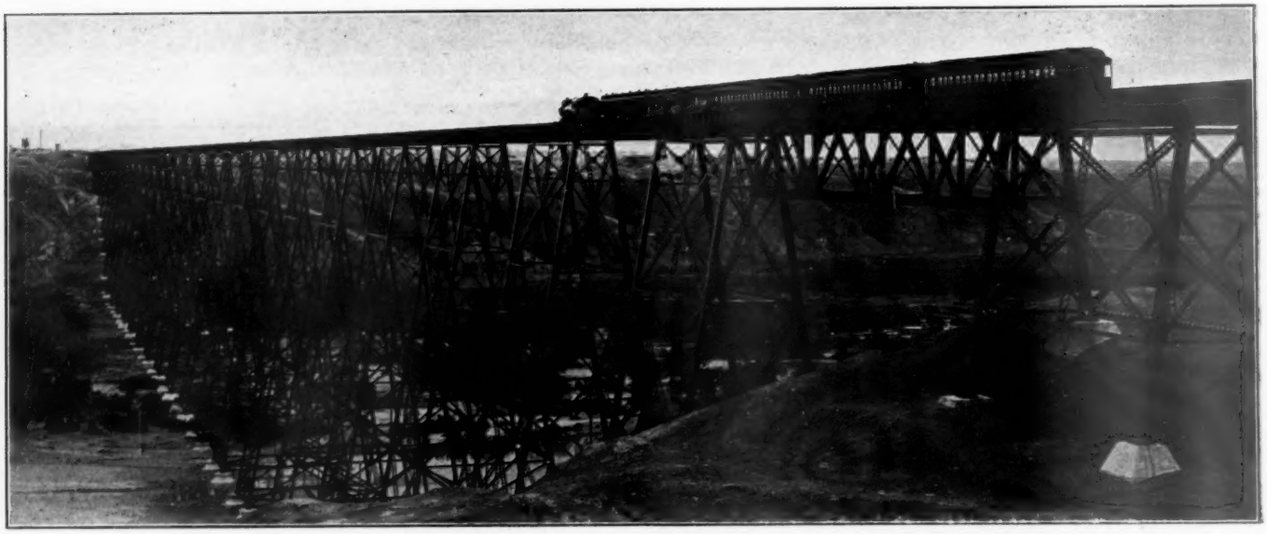


Luthbridge Viaduct on the Canadian Pacific. This 5,327-ft. Structure Reduced the Mileage More Than Five Miles and Cut Out 37 Curves.

The Canadian Railways Are in a Bad Way

Public Is Awakening to Seriousness of the Situation, but No Solution Seems to Be in Sight

By J. L. Payne

FROM THE BEGINNING of 1914 to the end of 1919, the railways of Canada had a trying experience. In 1920 conditions grew worse. Bad, however, as things were during the years of the war, and acute as they became in 1920, they were still worse in 1921. They might be said to have passed during the past seven years from the positive to the comparative, and then to the superlative degree.

In all this one sees the close parallel between operating results on both sides of the line. While this has always been true in a measure, it has been peculiarly true during recent years, for a specific reason. The fundamental causes of trouble have come to be more and more identical. Washington and Ottawa have drawn closer together in regulative policy; so that if there had been no international boundary during the past ten years it would not have mattered seriously whether the railways of Canada and the United States had been controlled by either the Interstate Commerce Commission or the Board of Railway Commissioners at Ottawa. If these tribunals had agreed upon a plan of co-operation or joint action, they could scarcely have coincided more closely in their rulings and general scheme of administration. It might be said, broadly of course, that in all essential respects the general conditions of operation, as governed by state regulation, have been the same on both sides of the line.

THE YEAR 1921 was the worst one in Canadian railway history. Labor situation and operating results have closely paralleled those in United States.

Increases in net have been made at the expense of maintenance; this is piling up and, of course, must be made up in the future. Labor demands arouse the public. A rate cut was made in November.

Will the Canadian Pacific be forced to take over the national group?

No International Boundary for Brotherhoods

This coincidence as to regulative policy took very positive shape in 1918. When the McAdoo award was given in that year it became as immediately effective in Canada as it did in the United States, barring only the national agreements. They could not specifically apply to Canada because of the nature of the agreements themselves; but Canadian railways were at once affected by many of their baneful features. The same thing occurred in 1920 when the Chicago award was given. The railways of Canada were as directly bound by the judgment of a foreign tribunal as if that tribunal had positive jurisdiction in the Dominion; and it is a strange thing the question of national solidarity was not raised. It was not, for the sufficient reason that it would have been futile. The National Railways Labor Board could not legislate for Canada any more than could Congress; but the brotherhoods could. The international scope of the railway labor organizations explains the whole thing.

The tightening troubles of the railways grew out of rising operating cost, and rising operating cost grew very distinctly out of the swollen payroll. The brotherhoods had no international boundary. What they gained in the United States was passed on to Canada. And this situation persists. The forces of labor have no flag. They fight under a common banner.

Worst Year in Canadian Railway History

Let it be repeated, so as to return to the primary theme, that 1921 was the worst year in Canadian railway history. The situation in the first three months of the year had in it all the possibilities of general bankruptcy. In January the ratio of operating expenses to gross earnings was over 108

per cent for all the railways of Canada as a group. This meant that, while strong roads, like the Canadian Pacific and four or five others, were holding their heads above water, the government system was floundering under an adverse ratio of 125 per cent. But there was this vital difference. The state system had the treasury of the Dominion to fall back upon, and represented over 52 per cent of the total operating mileage of the country.

Obviously this could not long endure. Traffic was slumping month after month. Relief from burdensome operating cost was not in sight. Deflation was under way in all the countries of the world, causing trade to shrink alarmingly; and traffic and trade are always interchangeable terms. If the headlong plunge toward insolvency was to be arrested the initiative must come from within rather than from without. The logical remedy would have been to increase the earning power of the railways; but it was felt that would be a most unpopular move, and a doubtful expedient too. Past a certain point you cannot go in the matter of tolls, without defeating the end in view. The people of North America had become accustomed to the lowest freight rates in the world, and were fretting under the increases which had been imposed as a means of offsetting the additions made to operating cost. That these increases had not been sufficient was ignored by the public. It was believed the new rates were cramping business, and probably they were. So the railways resolved to save themselves by heroic and intensive, albeit not wholly sound, measures of retrenchment.

"Life or Death?"

In April began a slashing of expenses which has had no precedent in Canadian railroading. Maintenance was cut to a point hitherto regarded as inexpedient and unsafe. Train mileage was reduced in every possible direction. Men were let go from every department by the thousands. Then in July came the cut of 12 per cent in wages, and in September the movement of a bountiful harvest once more brought traffic to a temporarily buoyant state. While gross earnings steadily declined from the 1920 level, net earnings rose as the result of lowered operating expenses.

It is possible that unthinking and uninformed onlookers were deceived by this betterment on the side of net earnings; but not so the railways. They knew full well that such results had been won by methods both temporary and unsound. They did not delude themselves with the notion that maintenance could be cut without carrying with it the necessity of restoring to the property the money thus withheld; so that what was saved today would be lost tomorrow. Yet necessity is a cruel master. They had to do it. It was the only way of meeting an emergency which had in it the elements of life or death. Just how the experiment will turn out in the long run is in the lap of the gods; but those who are open-eyed and conservative are apprehensive about the results.

Official statistics for the full year are not available. The monthly reports at this time of writing come down to the end of August. For that period the gross earnings of Class I roads had an aggregate of $277,478,122, as compared with $282,841,087 for the corresponding eight months of 1920. Operating expenses, on the other hand, totalled $268,266,928, as against $285,592,109 for the preceding year. Thus, while income declined by 1.9 per cent, outgo shrank by 6.1 per cent. That tells the story of economy; and those who are familiar with the general situation in North America will see how closely this result corresponds with what happened coincidentally in the United States, and by precisely the same means. Collateral to the foregoing figures is the fact that ton-miles decreased from 18,855,679,998 to 14,739,895,867, or by 16.6 per cent.

This enforced policy of retrenchment struck directly at the payroll, which was the controlling factor in operating expenses. This will be seen by a comparison of the wages-bill by months:

	1920	1921
January	$19,378,812	$21,960,258
February	19,525,340	19,923,386
March	20,808,205	20,327,326
April	20,097,354	18,999,980
May	23,076,014	19,415,027
June	24,578,970	20,220,220
July	25,500,767	20,155,796
August	25,430,331	20,312,321

It will be observed that, while for the first three months of the year the increase over 1920 amounted to $2,498,613, the decrease for the succeeding five months reached $19,580,092. During this latter term there had been a cut of nearly 16.5 per cent, which will be conceded to have been drastic. And this occurred with only slight relief from the decision of the Labor Board, which was not made effective in Canada until toward the end of July. It was simply the result of reducing the maintenance and operating staffs to the lowest possible point under the pressure of circumstances.

Public Becomes Aroused

The tribulations of the railways were not, however, without some measure of compensation. They aroused public interest in the situation. People began to inquire why the railways were in such a desperate plight. About that time the long drawn-out hearing before the Labor Board in Chicago caught general attention. The press, for the first time, took up the matter, and, from the publication of the news dispatches, went on to editorial criticisms. This was all novel, and, stranger still, the comments were favorable to the railway side. Men of affairs were impressed by the facts, as disclosing the pinch of labor cost on the agencies of transportation. The greedy grip of the brotherhoods was recognized in the adversities of the railways. Everybody saw clearly the relationship between cause and effect. Obviously, the railways could not hold their own while operating expenses had been raised far beyond the earning power involved in higher rates. The question was too simple to admit of any other than one conclusion.

Back of this attitude on the part of the public was a wholly selfish consideration, as natural as it was logical. High tolls were positively unpopular. Everybody wanted them reduced; yet everybody realized that they could not be reduced, except at the expense of ruining the railways, while wages remained high. Under normal circumstances, actuated by a standing grudge against the transportation corporations, their sympathies would have been with the workers. It was something new, therefore, both to the railways and to the employees, to find public sentiment take this swing, and probably as surprising to one as to the other. The press, without an exception, voiced this disposition of the people. The wages problem came in for nearly as much consideration as did politics, and for the first time in more than half a century the cause of the railways did not lack for valiant champions. The papers teemed with examples of the scales of pay awarded to railway employees.

It would be pertinent at this juncture to tell succinctly what happened in Canada when the Labor Board ordered a 12 per cent cut in wages. It has already been made clear that when the McAdoo and the Chicago awards were given, the question of jurisdiction was not raised on the Canadian side of the line. Instead, instant effect was given to these judgments. When, however, the Labor Board gave a decision in May last adverse to labor, the Canadian unions at once fell back on their geographical position. They refused to recognize the jurisdiction of a foreign tribunal, and appealed for a board of arbitration under the Industrial Disputes Act. They got it. Meanwhile, however, the railways had given effect to the cut. And then, just as the arbitration proceedings had got well under way, the threat to strike in the United States was announced. Public feeling burst out afresh against the unions, and, when the strike order had

been withdrawn across the boundary, the struggle in Canada came to an abrupt termination with a verdict adverse to the appellants.

Rates Reduced 10 Per Cent

With the reduced wages scale in effect there has ensued an insistent demand for the lowering of freight tolls. Press and public are as united in this action as they were in opposing the demands of labor. There are not, however, the old allegations of greed, nor is there in this appeal the former spirit of cold hostility. The demand is based on public interests. Deflated freight rates are said to be as urgently needed for the revival of trade as are deflated prices in general, and the railways are being asked to take their share of the common losses incident to readjustment. The matter came to a focus about the middle of November, when the Railway Commission ordered a reduction in both freight and sleeping car tolls, the effect of which will work out at 10 per cent all round. In their efforts to meet this cut, which will involve a loss in revenues of something over $40,000,000, the railways may have a hard time of it. They are not yet out of the woods. Far from it. At no later date than the early spring can they hold off on making up for the autumn skimp in maintenance. Meanwhile, a revival of traffic has not begun.

In this connection, a grave question is slowly but surely pushing its way to the front. Whence will the railways obtain capital for needed extensions and betterments? In view of the immediate situation as to net earnings, investors will be apt to be shy. With high class bonds selling at from six to eight per cent, the railways have very little chance to get in at lower rates. And it must be remembered that, so far as Canadian roads are concerned, 75 per cent of their financing was done at rates of five per cent and under. The matter has not been looked into for the purposes of this article; but it is definitely known that a considerable volume of liability will soon mature. To increase fixed charges will inevitably intensify the problem of making both ends meet, already acute. This is an aspect to which the onlooking public gives little or no consideration; but it is nevertheless very real and very serious. It applies to all those units within the national system whose liabilities were assumed by government as well as to corporate roads.

Enormous Deficit of Government Railways

This reference to the nationalized group brings to mind two significant happenings of the year. In the first place, the Grand Trunk was formally added to the state group on a basis, decreed by the arbitrators, which cuts the stockholders off without compensation. This has been all the more astounding because of the treatment accorded in 1918 to the Canadian Northern, which certainly was in a vastly worse position than was the Grand Trunk. The national system is now complete, and there is no indication that any further additions will be made. In the next place, a general election was announced in October, with polling fixed for December 6, and the campaign at this moment under way has, for the first time, brought the railway policy of government up for public discussion. The only constructive feature developed has been the stand of a wing of the Liberal party, led by Hon. Rodolphe Lemieux—who was prominent in the Quebec representation in the Laurier administration of 1896-1911—in favor of the plan of Lord Shaughnessy. That plan contemplates the taking over of the national system by the Canadian Pacific; but the time is not ripe for fair and unprejudiced consideration of such a measure. On the other hand, alarm is freely expressed at the enormous annual deficit which attaches to the government group. Yet all this discussion is more academic than practical; for the Canadian National Railways, for good or ill, is an accomplished fact, and nothing that can be said at this stage will in the slightest degree alter it.

At the commencement of the campaign, Sir Joseph Flavelle issued a statement which put the case fairly before the people. He intimated that the deficit for the current year would probably be $67,000,000, and that there was no hope for any more than a gradual reduction of that loss as time proceeded. Everything would depend on circumstances, with the settlement of the North West as a prime factor. Nevertheless, to everybody's surprise, Sir Joseph's announcement had scarcely been given out than the Canadian National reported an operating surplus of $40,000 for August, and, a month later, a credit balance of $500,000 for September. While this is purely a bookkeeping showing, and has not aroused any genuine hope, it should be explained that the Canadian National moved a much higher proportion of the western crop this year than it did last. This was the result of sustained propaganda in behalf of the government system, the basis of which was that the people should support their own road in the interest of their own pocket.

The situation has not been vitally altered as to the Canadian National. When the account in full has been made up for the year, it will be found that any temporary benefits realized by a spurt in traffic, and helped out by a favorable monthly pro-rating of expenses, will be wholly offset by the increase in fixed charges arising out of larger capital liability. It would not, in fact, be at all surprising if, when sound accounting has been applied to the system—which, by the way, has been wholly lacking in the past—the shortage for 1921 should exceed $120,000,000. It might be nominally put down at somewhere around $70,000,000; but that would leave out of the calculation a very large amount of fixed charges which, while hitherto ignored, are nevertheless just as genuine as those which are recognized.

Summing Up

Summing up the facts for the year in relation to all railways, it might be said that gross earnings will probably run slightly ahead of those of 1920, while operating expenses will show a decrease. Freight tonnage will reveal a considerable slump; but, on the other hand, passenger traffic may go beyond that of last year. There has not been any addition to operating mileage; for while there has been some construction in the west, there has at the same time been a reduction of parallel mileage on the government units. Substantial additions to equipment have been made, most of them from domestic sources of supply and for the Canadian National, which had been shockingly short. In one way and another, probably $100,000,000 has been added to capital on the government lines. In the labor field the horizon for the time being is clear, although the Canadian roads will be impelled by their urgent needs to follow suit in whatever may be done by the American roads. In short, the year 1922 will open with intense anxiety on the part of all the railways of the Dominion.

A Typical Swiss Railway Station

Saddle Mountain, Montcrey, Mexico.

Mexico Makes Progress in Railway Rehabilitation

Traffic Arrangements with United States Lines Restored—Large Additions to Motive Power

THE PROGRESS towards rehabilitation which characterized 1921 in the railway situation in Mexico approaches the remarkable. It is in sharp contrast with what took place on the railway lines of almost every other country. Suggestions that the railway situation in Mexico was showing considerable improvement were in evidence prior to the beginning of the year. The steps of real importance, insofar as concerns the relations between Mexico and the United States, took place in 1921.

The beginning of the year was signalized by the restoration, effective January 1, of the A. R. A. per diem rules and the resumption of interchange with the United States carriers. For a period there was considerable congestion at the border points. In February, however, Francisco Perez, then director-general of the Mexican railways, arranged for the loan of a considerable number of locomotives. He secured ten from the St. Louis Southwestern, nine from the Illinois Central, eight from the Missouri, Kansas & Texas, three from the Gulf Coast Lines and a number from the International & Great Northern. He also similarly secured 200 tank cars. The Mexican motive power situation was bad. Mr. Perez said at the time that there were 581 locomotives in service and 161 awaiting repairs. He also said that there were 13,262 cars in service as compared with 22,000 before the revolution. The borrowed locomotives and others, leased or purchased, promptly enabled the Mexican lines to make a better attempt to move their traffic and the congestion was greatly relieved.

Not satisfied with this alone, the National Railways shortly after placed sizeable orders for new locomotives. The orders for the year included 35 Mikado, 20 Pacific, 40 Consolidation and 22 narrow gage locomotives ordered from the Baldwin Locomotive Works and 20 heavy Consolidation and seven heavy Mikado locomotives ordered from the American Locomotive Company. The importance of the order is contained not only in the fact that it represented a restoration of Mexican purchases after a lapse of several years; it also represented the largest order for locomotives placed by any system in North America during 1920.

PER DIEM and interchange relations with United States lines have been restored, and traffic congestion at the border has been relieved.

The National Railways of Mexico placed the largest orders for new locomotives in 1921 of any system in North America. They built 102 miles of new line.

Officers of connecting roads in the United States express optimistic views regarding their relations with Mexican lines.

W. M. Whitenton, assistant chief operating officer of the Missouri, Kansas & Texas, in an article in the *Railway Age* of January 7, 1920, entitled "The Present Railway Condition in Mexico," said, "As I view the situation, the crying need of the Mexican railways is capital for the rehabilitation of the rolling stock and motive power and the expansion of facilities in order to take care of what must necessarily follow a stable government —an increased volume of traffic." Mr. Whitenton's statement points out the importance of the motive power situation. The placing of the orders for nearly 150 new locomotives shows, therefore, the courage with which the matter has been approached.

Another interesting factor during the year is shown in the construction of new lines. The National Railways of Mexico in 1921 built 102 miles of new line, as follows: From Llano Grande to El Salto, in the state of Durango, 24 miles; from Los Bancos to Cerro de la Cruz, also in Durango, 17 miles; from Zaragoza to Santo Tomas, in Coahuila, 32 miles, and from La Vibora to El Oro, also in Coahuila, 30 miles. There are also two lines under construction in Coahuila, from El Oro to Sierra Mojada, 9 miles, and from Santo Tomas to Villa Acuña, 28 miles. A line is projected and is

now being surveyed from El Salto to Mazatlan, 165 miles.

One of the several unusual methods of operation developed to meet the conditions of revolution and its aftermath was a scheme whereby private companies contracted to move freight in their own trains. The rate was 50 per cent above the regular rate and the contractors did a thriving business. With the restoration of the Mexican railway management, this idea was finally superseded by more ordinary methods of operation.

Relations With U. S. Lines

The Mexican railway situation is extremely interesting of itself. The American railway man will find even a more interesting aspect of the matter in the relationships between his own lines and the Mexican lines. With that idea in mind, the *Railway Age* has communicated with a number of the executives whose lines are handling Mexican business. It has received replies from J. S. Pyeatt, president of the Gulf Coast Lines; Thornwell Fay, executive officer for the receiver of the International & Great Northern and from H. B. Titcomb, president of the Southern Pacific of Mexico. Their communications are given below. The impression conveyed by them is most optimistic.

"The congestion of freight, and limited passenger service, which resulted from the destruction and disabling of locomotives and equipment during the revolution has now disappeared," says Mr. Pyeatt. He also says, "We operate through sleeping parlor and dining cars to Monterey, Tampico and Mexico City and the service, with few exceptions, is operated on schedule and I understand is quite satisfactory to the traveling public."

"There has been, since the early part of this year, a remarkable improvement in the operation of the National Railways of Mexico," says Mr. Fay. "They are giving most expeditious movement now to all traffic which is delivered to them." Mr. Fay comments, however, on the decreased volume of traffic. The International & Great Northern, he notes, has for some time been operating through sleeping cars from San Antonio to the city of Mexico. One of his most interesting comments is a statement concerning the main line between Nuevo Laredo and the city of Mexico. "The physical condition of this line," he says, "being as good as almost any road in the United States."

Mr. Titcomb's remarks relate to conditions in Mexico in general and outside of the railway situation. He has some interesting comments on the possibility of constructing a line of railway from La Quemada to Tepic which has been in contemplation for some time.

The letters follow:

Observations On a Trip in Mexico

By H. B. Titcomb

President, Southern Pacific of Mexico

We traveled over the National Railways of Mexico, from Nuevo Laredo, through Monterey and Victoria, to Tampico. The great steel mills at Monterey were active, and there is a considerable output of rail shipped from this plant.

At Tampico there was considerable activity and development work going on in the oil fields. True, this is not to the extent and magnitude of a few years past, but the improvement work on the Panuco river, such as dredging 200 meters in width and ten meters in depth, has been in continuous progress under the direction of the Mexican government for some time, thereby giving facilities to large tankers and making it possible to increase and facilitate the exportation of oil from this very rich field.

The city itself is suffering, however, from decrease in business and there are a great many unemployed there, but the bustle and activity on all sides portend for the return of business in the very near future.

The question of the export tax on oil as covered by a decree of the government of June 7, 1921, has tended to retard development and exportation, but on every hand optimistic feeling was manifest that conditions would improve and that some satisfactory arrangement would be made with reference to this situation.

From Tampico to San Luis Potosi, and thence to Mexico City, was made without any particular incident. At San Luis Potosi, where the day was spent on inspection, I was impressed with the friendly feeling and respectful attitude of the Mexican citizens. This is really a beautiful city. The people seem to be contented even though not enjoying all the pleasures of this world. Merchants are optimistic, even to the small peddlars on the street, who were pleasant and happy.

From Mexico City to Guadalajara and Grendain, we traversed a very interesting part of the country. The state of Jalisco is particularly rich in its grain products, cattle and in the cultivation of the "maguey" plant, from which is extracted the famous "tequila" wine. My mission to Mexico City was to establish cordial relations with the government as representative of the large properties under my jurisdiction, and I am pleased to state that on every hand, I met a very pleasant reception. I was particularly impressed with the attitude of President Obregon, and his frankness in discussing the problems that confront him.

I conveyed to President Obregon the wish of the Southern Pacific Railroad of Mexico to complete the long-deferred construction of the railroad from La Quemada to Tepic, a distance of about 100 miles, which would give Mexico City a complete rail connection from the west coast of Mexico, and to this end suggested that if it were possible for the government of Mexico to recognize the claims of the railroad company, which amount to approximately 32,500,000 pesos, either by bonds or other negotiable paper of the federal government, the railroad company, in turn, would spend the amount in the construction of the 100-mile gap and in the reconstruction of its west coast properties, as fast as the government could liquidate these obligations. By these means the Republic of Mexico would be given a much needed rail transportation line, or it might be called transcontinental line, and at the same time liquidate its just obligation.

I was highly gratified at the interest shown by President Obregon in his statement that the matter would be given careful consideration. He was careful to make no promises that he could not fulfill, which is a trait to be admired. The completion of this line from Tepic to La Quemada will open up a stretch of territory for development and for the marketing of its products, that is beyond the dream of the ordinary individual.

There are 11 main streams that cross the state of Sinaloa alone, and there are upwards of 3,000,000 acres of land susceptible of cultivation of the highest degree. On one of the large holdings in the state of Nayarit, known as the Hacienda of Aguirre, are three textile mills and one sugar factory that has a large revenue yearly, even under the most primitive methods that are employed, and in spite of being separated from the tremendous markets of Mexico City and Guadalajara.

President Obregon and the chamber of deputies are now wrestling with the subject of the agrarian laws, and it is confidently hoped that in the near future security of land titles will be perfected, which will invite thousands of settlers and the investment of millions of dollars in development work on the west coast of Mexico.

In all my travel through Mexico I met with most courteous treatment and no foreigner need fear of traveling in Mexico as long as his mission is an honest one and he goes there not to exploit the country, but to develop it. I was particularly impressed with the patriotism of the Mexican and the love for his country, which is admirable.

Congestion Has Practically Disappeared

By J. S. Pyeatt

President, Gulf Coast Lines

Concerning conditions on the National Railways of Mexico, it is entirely fair to say that from a standpoint of service they are now quite satisfactory.

The congestion of freight and the limited passenger service which resulted from the destruction and disabling of locomotives and equipment during the revolution has practically disappeared. The Mexican railways now operate on their primary lines double daily passenger service, and sufficient freight service to transport without unusual delay all freight traffic offered. A considerable amount of new motive power has been purchased and delivered to the National lines during the past six months, which enables them to meet at least in a fair degree the transportation needs of the country. The heavy reduction in traffic has also contributed to this result.

The roadbed generally seems to be in good condition and disabled equipment, fit for further use, is rapidly being rehabilitated and put in service.

The Gulf Coast Lines operate through sleeping, parlor and dining cars to Monterey, Tampico and Mexico City, and the service with few exceptions is operated on schedule and I understand is quite satisfactory to the traveling public. Our principal interchange is through Brownsville and Laredo; at the former place we make direct connection over International Bridge, and at the latter through the Texas-Mexican Railway, a subsidiary of the National Railways of Mexico. Interchange relations have been entirely satisfactory. The National Railways comply strictly with the American Railway Association rules governing interchange, per diem, inspection, etc., and have always met promptly all of their obligations so far as our company is concerned.

Summing up, my opinion is that while we have no knowledge of the operating results of the National Railways, the service, both freight and passenger, is now ample to meet the normal requirements of the country and there are no unusual difficulties attending the use of the railways at the border by the public, or the interchange relations of the different roads forming junctions at the border.

Remarkable Improvement in Operation of Mexican Lines

By Thornwell Fay

Executive Officer for Receiver, I. & G. N.

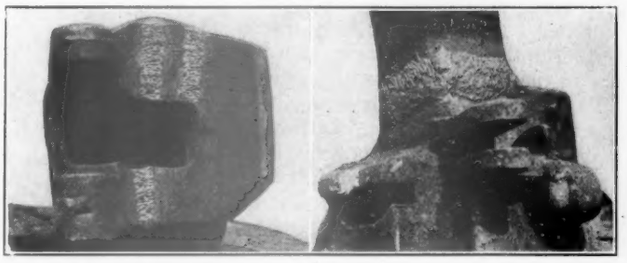
There has been, since the early part of this year, a remarkable improvement in the operation of the National Railways of Mexico. In the months of January and February, 1921, there was quite an accumulation of freight at all Mexican border points, for Mexico, and the National Railways were short of power. At this time a number of private concerns, which either owned or managed to rent locomotives, had arrangements with the National lines for operating trains over their lines. They were handling freight for the public at 50 per cent above the regular rates, and for a while had all the business they could handle. The Mexican lines also rented a number of locomotives, principally from Texas railroads, and later placed a contract with locomotive builders for building new locomotives. With the assistance of this additional power the accumulation was gradually decreased and the operation of trains by private individuals was discontinued about September 1, 1921.

About this time also there was a marked decrease in the volume of traffic into Mexico, to a great extent in corn and other grain—the Mexican crops having been harvested. At the present time the Mexican roads are suffering from the decreased volume of traffic, the same as most of the railroads in the United States and particularly those in Texas, and they are giving most expeditious movement now to all traffic which is delivered them. My information is that they are making regularly from four to five days from Laredo to the City of Mexico on car load shipments. Many of their new locomotives have been received and the congestion everywhere has been cleared up some time since.

The present management of the Mexican Lines is quite progressive. The lines are fast getting rid of the large number of American railroad cars that formerly went into the country. There is very little northbound traffic out of Mexico and unfortunately most of these cars come back to the American connections empty. The International & Great Northern for some time has been operating through sleepers from San Antonio to the City of Mexico, and return, and since October 15 a cafe dining car has been run on these through trains, which also goes through between San Antonio and the City of Mexico, making the trip exceedingly comfortable.

During a recent trip to the City of Mexico we noted, with great pleasure, the excellent physical condition of the track on the main line between Nuevo Laredo and the City of Mexico. The greater part of this line is laid with heavy rail and excellent stone ballast, and the physical condition of the line is as good as almost any road in the United States. The locomotive enginemen on the Mexican railroads seem to be exceedingly efficient and their handling of the air brakes was so skillfully done that never a jar or a jerk was experienced in stopping or starting from stations or water tanks. This is quite a contrast to the experience on some of the American railroads.

Our relationship with the Mexican National Lines and officials has been most cordial and agreeable. I feel sure that they are now in a position to handle promptly a largely increased volume of traffic.



A Triple Electric Weld in the Face of a Coupler and a Welded Coupler Shank

Photo by Keystone

Station at Caracas, Venezuela

View of Midland Railway Main Line, 5 Miles from St. Pancras

Review of English Railways During 1921

A Year of Revolutionary Changes—Railway Act Becomes a Law and Roads Returned to Private Owners

By Robert E. Thayer

THE YEAR 1921 will stand long as a momentous year in English railway history, with its Railway Act; the return of the railways, after seven years, to private control; a serious coal strike, and an abnormal slump in traffic. All these things have contributed to complicate the railway problem in Great Britain and so wide-reaching are their effects that no one is in a position to prognosticate as to the future. The situation is so fundamentally novel that there is no precedence upon which deductions can be based. This is particularly disconcerting to the British railway man who has in the past been able to prognosticate with a fair degree of accuracy future railway conditions. During the past 50 years Great Britain's railway developments have been gradual and along well preconceived lines so that now, with what might be termed a revolution in railway management and operation, the British railway men find themselves faced with a gigantic problem.

The British railways have not only got to face the more or less theoretical problems imposed upon them by the new Railway Act, which of itself is a great undertaking, but they have also to face practical problems such as an abnormal slump in traffic and an extraordinary increase in expenses. Existing rates are conceded to be, both by the railway owners and the shippers, considerably higher than what the traffic will bear. At the same time wages are about 200 per cent higher than obtained before the war. The railways are thus in the unfortunate position of not having revenue enough even with the high rates which must be reduced, to meet the present wage scale and working conditions to which they are bound by an Act of Parliament. One great purpose of the Railway Act, with its grouping scheme, was to so consolidate railway affairs in Great Britain as to permit of economy of management, but it is well recognized that any economies possible from this consolidation will be a mere drop in the bucket of the economy necessary to put the English railways on a sound financial basis.

ENGLISH railways have been and are faced with the most serious and difficult problems they have ever been called upon to solve. Enforced by law to unite themselves into four distinct groups, and at the same time called upon to face the most unprecedented financial situation, with abnormal trade conditions, high wages and rates that must be reduced, their problems are stupendous. Old established English railway methods are destined to receive harsh and revolutionary treatment.

The abnormal decrease in traffic which has and will upset the best calculations is, of course, the direct result of the economic conditions of the country and Europe. It is patent that railway prosperity depends upon the prosperity of the nation's industries. The reason for Great Britain's industries being in such bad shape is attributable to two factors: the high cost of production and the disparity in money values between England and the other manufacturing countries of Europe.

Great Britain is an exporting nation. It can only live by the trade it carries on with other countries. Europe is Great Britain's best customer, but Europe cannot afford to purchase British goods. Furthermore with the greatly decreased value of the currency in the Continental countries, those countries can produce cheaper to themselves than can England. Furthermore, the Continental countries are in a position, and have for the past two years, to undersell Great Britain in practically all foreign trade. These countries came out of the war in much worse condition than Great Britain to the extent, poverty having become so keen, that the laboring classes are working for lower *real* wages (when the depreciated value of the currency is taken into account) than they did before the war. These trade conditions therefore will have a great deal to do in the next five years with the prosperity of the British railways, and the prospects as they appear today are poor.

The grouping of the railways as required by the Railway Act involves of itself a heavy task for the British railway companies. A scheme on such a grandiose scale is wholly foreign to previous railway policy, not because the British railways did not desire railway amalgamation, but because the people of the nation would not permit it. While there

may be railway systems in the United States which will approach in magnitude the size of the groups outlined by the Railway Bill, it must be remembered that these American problems have been developed gradually over a period of years and along economic lines. The English grouping on the other hand may be called a "paper amalgamation" based more upon theoretical and geographical lines than on practical and economic lines. Thus the British railways are called upon to perform overnight, as it were, what the United States has done over a period of years.

Furthermore, the managerial policy adopted by the British railways in the past does not lend itself to the management of a large group of railways. Thus almost an entirely new system of management must be installed to give, as Sir Henry W. Thornton expresses it, "a centralization of policy and a decentralization of detail." That the British railways will measure up to the task there is no question of a doubt, for there is yet to be recorded an economic problem which the good sense of the British nation, taken as a whole, has not solved.

It is thus apparent that the British railway situation is by no means a simple one. It will demand the best railway talent in Great Britain to solve it and the most searching inquiry into all phases of railway operation. Being blessed with a very low wage scale up until the war and being cursed by the lethargic tendencies of the seven years government control, the problem of making good under a 200 per cent increase in wages without being able to absorb that increase by an increase of rates, it is evident that the problem becomes a stupendous one.

The Financial Situation

Strange as it may seem, it is impossible to say definitely just what the financial situation of the railways is at the present time. In fact, the railways hardly know themselves. Being handed back to their private owners on August 16, last, there has been no opportunity of casting up figures to give any definite idea of the exact situation. During the seven years of government control a different system of accounting and of keeping records was installed than that which the railways generally followed. On the return to the owners the government's method was more or less scrapped and the old method followed by the railway companies before the war was replaced. This primarily accounts for the fact that sufficient information is not available at present to get a proper idea of the situation.

An indication of the situation, however, may be found in the fact that the British government found itself at the close of its operations last August with a deficit of $250,000,000, even though it was anticipated that the increase in rates put into effect the latter part of 1919 and at the beginning of 1920 would allow the government to break even. The reason these plans did not materialize is attributable to the serious coal strike in the Spring of the past year, with the accompanying increase in railway expenses, and with the great decrease in business. It will be remembered that these increases in rates amounted to 75 per cent in passenger fares and about 112 per cent in freight rates.

In 1913 the operating ratio was 64 per cent. In 1919 it rose to 94 per cent, in 1920 to 98 per cent; between 1913 and 1920 there was an increase of 97 per cent in the receipts accompanied by an increase of 200 per cent in expenses. What the position is today it is not possible to say, but the railway companies are looking forward with great anticipation to the $125,000,000 due them from the government on January 1, 1922, in accordance with the provisions of the Railway Act, to carry them over any difficulties in which they may find themselves.

While this $125,000,000 will be available for dividends, Sir George Paish, in discussing the "Future of the British Railways" before a recent meeting of the Institute of Transport, has cautioned the railways to think wisely before they part with this amount for dividend purposes. Sir George foresees difficult times ahead and recommends the utmost conservatism in order to forestall receiverships and loss of confidence in railway securities.

An indication of the degree of confidence the investing public now has in railway securities is indicated by Table 1, which compares the high stock values of 1913 with those obtaining on December 6, 1920, and December 13, 1921.

TABLE I—COMPARISON OF STOCK VALUES

	High, 1913	December 6, 1920	December 13, 1921
Caledonian:			
Ordinary stock	79½	36½	29⅝
Preferred converted	59¼	28¾	24½
Glasgow & South Western:			
Deferred ordinary	44½	21½	15¾
Great Central:			
Deferred ordinary	17¼	5½	4
Preferred ordinary	39⅝	10½	8
Great Eastern	63½	30	27⅜
Great Northern:			
Deferred	57¼	28¾	23½
Preferred	88¾	44½	41¾
Great Western	119¾	74¾	70¼
Lancashire & Yorkshire	91½	53	49¾
London, Brighton & South Coast:			
Deferred ordinary	95	44½	38½
London & North Western	136¾	75¼	69⅜
London & South Western	39⅞	20¾	18½
Midland:			
Deferred	77⅛	48	43¼
Preferred	60⅜	33	34⅞
North British	32⅞	13	9¼
North Eastern	124	78½	71⅞

It will be seen that there has been quite an appreciable decrease during the past year and a most decided decrease over the 1913 values.

Under the present circumstances the railways obviously would encounter difficulties if they went into the open market for funds for capital expenditures. As a matter of fact, while there are a number of opportunities for capital expenditures, particularly for electrification purposes, there is the tendency not to enter upon any such work until the grouping scheme has materialized. It is quite apparent that such a procedure would complicate the financial arrangements that must necessarily be made in forming groups and until they are formed there is not much liability of heavy new construction being undertaken. The largest project under consideration at present is the extension of the electrification of the London, Brighton & South Coast which will involve further electrification of the suburban lines around London and the electrifying of the line to Brighton. Detailed plans have been evolved but the manner in which this work is to be financed has not yet been decided.

The Ministry of Transport

The Ministry of Transport, having performed the particular function for which it was formed, namely, providing a solution of the British railway problem, is now more or less in the process of disintegration. Sir Eric Geddes resigned as Minister shortly after the roads were turned back to the private owners and is now chairman of a governmental committee known as the "super-axe" committee, which has been formed for the purpose of scrutinizing all government expenditures with the idea of eliminating those which can be dispensed with. There is now no Minister of Transport and the chief work of that department which will extend over a period of two or three years is the settling of the many claims arising from the government's control of the railways. While no definite governmental action has been taken as regards the Ministry of Transport it is anticipated that its functions will be absorbed by the Board of Trade and the Railway and Canal Commission. It is interesting to note in this connection the strong plea of labor for its continuance.

The outstanding work of the Mintstry is, of course, the draft of a Railway Act and pushing it through Parliament. Sir Eric Geddes is deserving of considerable credit for his work, for he had to contend with much opposition. Whether

or not his work has been for the best remains to be seen. There were only two radical changes in the bill as it was presented to Parliament. These were in the rearrangement of the groups, whereby the Scottish railways instead of acting as an individual group were linked up with two English groups to form the North Eastern, Eastern & East Scottish group and the North Western, Midland & West Scottish group, and the elimination of the representatives of labor on the Board of Directors of the groups. These changes came about by agreement between the railways themselves in the first case and between the railways and labor in the second case and against the government's own judgment.

Labor argued that representation on the Board of Directors as outlined by the proposed law would be a mere farce and of no material benefit to the men. This change was made in the Act at the eleventh hour previous to which labor threatened dire results were their representation on the boards to be eliminated from the law. The real truth of the matter is that labor used this as a club over the railways to obtain further concessions as regards wages and working conditions.

Of the various important committees established during Sir Eric's administration only one has presented an official report. That is the Advisory Committee on the Electrification of Railways. This committee has established certain general regulations to be observed by the railway companies when electrifying their lines with a view towards standardization of methods and appliances. It advocates the direct-current system at 1,500 volts for those railways which have not as yet electrified any lines, as well as those which are using the direct-current system at present. Either overhead or third-rail system of power collection is permitted. Three-phase alternating-current is recommended for the power generating units at 50 cycles, except where other frequencies are used in a particular electrification district. A special ruling was made in the case of the London, Brighton & South Coast, which uses single-phase alternating-current, giving that road the privilege of using that system in the extension of its electrified lines.

No report has been rendered in the matter of standardization or automatic train control, nor is there any prospect of such reports being forthcoming. As regards standardization it is argued that by grouping the roads as outlined in the Act standardization will automatically take care of itself, particularly in the groups themselves.

The Rates Advisory Committee which has been working on a reclassification of traffic items is still in the midst of its work and the task is of such great proportions that a report is not expected in the near future.

As has been previously pointed out, the grouping proposed by the Minister of Transport and made into law is the most radical feature in the bill. Executives of the railways are now carefully considering the problem with a view of organizing the groups within the time specified by the law, namely, January 1, 1923. During the past year one large step has been taken in this direction in the amalgamation of the London & North Western with the Lancashire & Yorkshire, which goes into effect January 1, 1922. In previous years these two campanies have been acting under various joint agreements.

Corollary to the proposed grouping, the manufacturers of locomotives, passenger coaches and freight cars have become more or less disturbed as to their future prospects for English business. The railways act empowers the railway groups to manufacture equipment for one another and the industries have made presentations to the Ministry of Transport with a view of insisting that private enterprise have equal right of competing for railway supplies with the railway groups themselves. No action was taken in the matter, however, because any such competition would not be possible for some years.

In anticipation of a final formation of the groups, the Eastern Group has entered upon an advertising campaign, both by bill posters distributed over the country and by circular matter, calling attention to the facilities offered the shippers by that particular group. This is indicative perhaps of the competition that will still obtain as regards through business, even after the groups have been formed.

Rates and Wages

Never before were rates and wages so much discussed on the British railways. The railways cannot get business under the present rates and they cannot pay wages without the present rates. Unfortunately the railways are bound by an Act of Parliament to maintain wages according to the schedule. There appears, however, to be a very conciliatory spirit on the part of the labor unions in this matter. Already a reduction of $1,625,000 per week has resulted from the maximum wage in the conciliatory grades on account of the sliding scale which operates with the rise or fall in the cost of living. In 1913 railway wages amounted to $3,862,500 per week. The maximum since that time was $13,502,250 per week, or an increase of 250 per cent. At present the wage bill is $11,877,250 per week, or slightly over 200 per cent of the prewar wage. The railway shopmen who come outside of what is known as the conciliatory grades are being reduced 12½ per cent, which was a government grant given them during the war to last until the termination of the war. A more detailed account of the manner in which wages have fluctuated is indicated in Table II for men other than those in shops, and Table III for the shop men.

TABLE II—WAR BONUS (NOW WAR WAGES) TO OTHER THAN SHOPMEN (ADULTS)

Date operative	Amount granted* (per week)	Total
February, 1915	50c or 75c war bonus	50c or 75c war bonus
October, 1915	75c or 50c war bonus	$1.25 war bonus
September, 1916	$1.25 war bonus	2.50 war bonus
April, 1917	1.25 war bonus	3.75 war bonus
August, 1917	War bonus converted into war wages	
November, 1917	$1.50 war wages	$5.25 war wages
April, 1918	1.00 war wages	6.25 war wages
August, 1918	1.25 war wages	7.50 war wages
November, 1918	.75 war wages	8.25 war wages
March, 1920	Wages and war wages were consolidated and the sliding scale agreement was put into effect.	
	$1.25 (war wages not included in agreement)	$9.50 war wages
April 1, 1920	Increase of $0.25	9.75
April 12, 1920	Increase of .50	10.25
June 14, 1920	National Wages Board award gave increases ranging from:	
	$0.50 to $2.12½	$10.75 to $12.37½
July 1, 1920	Increase of $0.50	11.25 to 12.87½
October 1, 1920	Increase of .50	11.75 to 13.37½
January 1, 1921	Increase of .25	12.00 to 13.62½
April 1, 1921	Decrease of 1.00	11.00 to 12.62½
July 1, 1921	Decrease of 1.25	9.75 to 11.37½

*25 cents is taken as the equivalent of one shilling.

TABLE III—WAGE INCREASE TO ADULT SHOPMEN (TIME WORKERS)

Date operative	Amount granted* (per week)	Total
February, 1915	$0.50 or $0.75 war bonus	$0.50 or $0.75
July, 1915	$0.75 in lieu of $0.50 or $0.75 war bonus	$0.75
April, 1916	$0.25 increase in wages	$1 wages
September, 1916	$1.25 war bonus	$1 wages, $1.25 war bonus
April, 1917	$1.25 war bonus	$1 wages, $2.50 war bonus
August, 1917	$0.25 increase amalgamated to make—$3.75 war wage	
October, 1917	12½ per cent bonus on earnings	
December, 1917	$1.25 war wage	$4.00 war wage + 12½%
September, 1918	.87½ war wage	4.87½ war wage + 12½%
December, 1918	1.25 war wage	6.12½ war wage + 12½%
November, 1919	1.25 war wage	7.37½ war wage + 12½%
April, 1920	$0.75 on basic rates	7.37½ war wage + 12½%
June, 1920	.75 on basic rates	7.37½ war wage + 12½%
August 15, 1921	$1.50 decrease on basic rates	7.37½ war wage + 12½%
November 19, 1921	Decrease of 4⅛ per cent on earnings	7.37½ war wage + 8⅓%
December 3, 1921	Decrease of 4⅛ per cent on earnings	7.37½ war wage + 4⅛%
December 31, 1921	Decrease of 4⅛ per cent on earnings	7.37½ war wage

*25 cents is taken as the equivalent of one shilling.

The eight-hour day has been one of the most unreasonable and unjustifiable clauses in the new working conditions obtained on account of the war; particularly is this so in the outlying or branch line districts. There appears some hope

that a more rational view will be taken of this matter by the railwaymen themselves. In fact the number of men who have been discharged from some of the railways, which varies from 15 to 20 per cent, in an endeavor to cut down the wage bill has shown the men the impossibility of their position.

As has been previously pointed out in these columns, the machinery for handling all labor questions has been set up in the railway act and provides for a Central Wages Board with a National Wages Board as a last resort.

The railway labor unions have been particularly hard hit this past year. It is estimated that the National Union of Railwaymen will pay out approximately $3,500,000 on unemployment alone during 1921. Furthermore, now that a law has been obtained for the handling of labor difficulties there is a strong disposition on the part of the men to allow their membership in the unions to lapse to the extent that it bids fair to embarass them to a considerable degree.

The rates problem is now under consideration, conferences having but just begun. The shippers are insisting upon a reduction in order that they may do business. Assistance has already been given in the matter of raw materials for the manufacture of steel in a 25 per cent decrease on iron ore, limestone and ironstone. The coal operators are now after a reduction. That they need one is without question, for coal, the basic commodity of Great Britain, is being sold at prices which are altogether too high. The railways themselves are paying 100 per cent over prewar prices. It was anticipated that by the time the railways were turned back to the private compensation) as against an expenditure of $1,224,000,000, which gives an operating ratio of 98.8 per cent. The government compensation amounted to $213,000,000. During 1920 important increases were made in rates and fares. The freight rates were increased by about 50 per cent on January 15, 1920, and again on September 1, 1920, bringing the average up to about 112 per cent over prewar rates. Passenger fares were increased on August 6, 1920, by 16⅔ per cent, making an increase of 75 per cent over prewar rates. Season ticket rates were also advanced to 50 per cent above prewar level and for workmen's fares a mileage scale was adopted on September 1, 1920, with a maximum increase of 200 per cent, or 50 cents a week, whichever was less. During this time a high level of prices and wages prevailed throughout the country and the coal strike, during the autumn of 1920, together with the great depression in trade, have affected the results.

The total engine mileage of all railways in Great Britain in 1920 was 575,576,239 miles, or an increase of 8.03 per cent over that of the year 1919. Train mileage was 378,070,430, as against 348,911,830 in the year 1919. The average receipts per train-mile from passenger train traffic fell from $2.55 to $2.40, but from freight train traffic they rose from $2.48 to $4.20.

The number of first-class passengers carried during the year 1920 was 37,675,085, or 15.62 per cent less than the previous year, but the average receipt per first-class passenger rose from 97 cents to $1.09. There were 1,096,585,156 third-class passengers carried, or an increase of 1.21 per cent over

TABLE IV—MONTHLY RAILWAY STATISTICS FOR ENGLAND, SCOTLAND AND WALES

	Year	Sept. 12 to Oct. 10, 1920	Oct. 10 to Nov. 7, 1920	Nov. 7 to Dec. 5, 1920	Dec. 5 to Jan. 2 1921	Jan., 1921	Feb., 1921	March, 1921	April, 1921	May, 1921	June, 1921	July, 1921	Aug., 1921
Net ton-miles—revenue freight (millions)	1920	.....	.....	.....	.....	1,610	1,512	1,735	1,511	1,580	1,623	1,646	1,516
	1921	1,497	913	1,412	1,264	1,370	1,213	1,216	567	471	489	1,031	1,241
Average length of haul (miles)	1920	.....	.....	.....	.....	56.89	57.04	58.05	58.00	58.15	58.55	58.60	58.41
Gross freight train receipts per ton-mile (cents)*	1921	57.88	63.00	55.73	55.02	57 58	56.97	56.14	68.00	71.89	71.29	58.60	57.43
	1920	.....	.....	.....	.....	2.724	3.290	3.314	3.408	3.252	3.164	3.268	3.310
	1921	.....	.....	.....	.....	4.146	4.348	4.450	6.164	.....	6.348	4.444	.....
Gross freight train receipts per ton-mile less cost of collection and delivery (cents)	1920	.....	.....	.....	.....	2.476	3.030	3.066	3.174	2.984	2.894	2.974	3.018
	1921	.....	.....	.....	.....	3.842	3.946	4.130	5.544	.....	5.710	4.148	.....
Average train load (tons)	1920	.....	.....	.....	.....	131 50	123.14	136.06	133.34	134.42	133.79	133.00	132.35
	1921	134.45	113.48	133.61	130.46	128.48	126.02	123.52	94.06	103.68	101.43	123.52	123.30
Net ton-miles per engine-hour	1920	.....	.....	.....	.....	404.27	407.91	424.84	426.32	435.51	441.44	438.81	432.92
	1921	426.82	360.39	415.18	395.37	415.59	414.85	417.91	322.02	359.86	355.27	421.00	423.12
Percentage loaded car miles	1920	.....	.....	.....	.....	71.38	71.04	70.86	70.77	70.47	70.16	69.47	69.90
	1921	70.3	74.99	69.03	67.92	67.66	68.01	68 45	78.11	79.61	77.95	68.29	66.29
Average freight car load (tons)	1920	.....	.....	.....	.....	5.40	5.42	5.49	5.45	5.45	5.43	5.45	5.38
	1921	5.44	4.52	5.59	5.67	5.57	5.37	5.23	3.70	3.72	3.64	5.12	5.30
Cars per train	1920	.....	.....	.....	.....	34.10	34.64	34.99	34.62	35.06	35.12	35.15	35.23
Average time per day cars in transit (hours)	1921	35.21	33.47	34.67	33.87	34.11	34.52	34.53	32.57	35.04	35.78	35.34	35.10
	1920	.....	.....	.....	.....	1.43	1.46	1.51	1.30	1.30	1.35	1.33	1.25
	1921	1.41	.88	1.32	1.23	1.11	1.08	.95	.51	.40	.46	.84	1.02

*1 Cent = ½ pence.

owners it would be possible to reduce the rates which were put into effect by the Ministry of Transport in an endeavor to wipe out the deficit, but as has been already stated the economic conditions and the coal strike made it impossible to accomplish this end.

Railway Statistics

The Ministry is to continue to compile the statistics in accordance with past practices. Table IV gives the twelve months from September, 1920, to September, 1921, the statistics for the current year being compared with 1920. The serious effect of the coal strike on railway traffic is clearly shown. Likewise the effect of the increased freight rates is shown in the receipts per ton-mile. Otherwise there is but little variation in the figures.

In addition to these monthly records the Ministry of Transport publishes yearly statistics, those for the year 1920 having recently been issued. These show gross receipts for Great Britain of $1,240,000,000 (without the government the year 1919, and the receipt per passenger was 30 cents as against 27.4 cents for the year 1919. In second-class passengers there was an increase of 6.90 per cent over the previous year. For all ordinary passenger journeys the average receipt increased from 30.22 cents to 32.74 cents.

Total tonnage carried was 323,971,117, or an increase of 4.21 per cent as compared with 1919. In coal, coke and patent fuel there was an increase of .65 per cent, and in other minerals an increase of 20.81 per cent. The total receipts per ton for all railways were $1.89 as against $1.05 in 1919.

Motor-Lorry Competition

In certain districts, particularly in the Midlands around Manchester, motor lorry competition has cut into railway earnings to some extent, although there is not much anxiety on the part of the railways as a whole on this account. In an endeavor to forestall any undue losses in this respect an attempt was made on the part of the railways to incorporate

in the Railway Act a section giving the railways power to operate and maintain motor transport in connection with the railway services. Owing to the opposition of the operators of motor transport lines, and to a certain extent shippers themselves, this was not allowed, the chief argument being that it would give the railways an undue monopoly of transport and perhaps entirely kill future development in road transport.

There are a few railway companies, however, which under previous Acts of Parliament are given authority to carry goods by motor lorry. Motor lorries can handle small parcels cheaper than the railways and they have a certain financial advantage over railways in that they are not subjected to the heavy property tax the railways have to pay. The whole problem of motor transport, however, is more or less in an embryotic state, for it has not been given the trial of years to determine whether or not it can be maintained as a paying proposition. After the war a large number of motor lorries used in connection with war transport were thrown on the market and purchased at a low figure. With the capital expenses thus small to start with, it has been possible to show satisfactory results, but whether or not this will continue is a question.

The motor char-a-banc for the conveyance of passengers, has during the past summer season proved remunerative. But there the conditions had a lot to do with it. England has never experienced such a stretch of settled and fair weather for 30 or 40 years. This gave the motor char-a-banc a wonderful opportunity of doing business. Furthermore, the novelty of this means of transport did much to swell the receipts. Except in long distance runs, such as from London to various seaside resorts, the motor char-a-banc should prove an asset rather than a liability to the railways for a large number of these services have sprung up in the pleasure resorts and have done much to attract visitors; to some extent the railways have benefited.

It is impossible to state definitely, due to the newness of this means of transport, as to just how much it will cut into the railways' business. The extraordinary growth of road transport for both freight and passengers has, however, been sufficiently large to cause some anxiety.

Railway Excursions

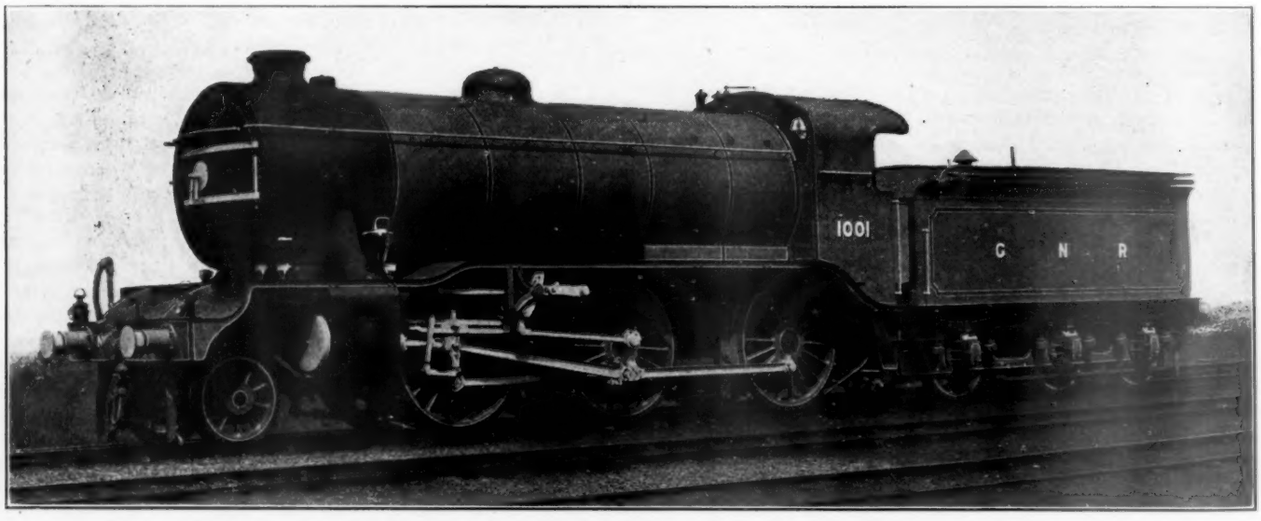
Perhaps the most outstanding feature from the public's point of view of the return of the railways to the private owners has been the large increase in the number of railway excursions offered by the railways to attract traffic. Day excursions at the rate of a single fare for the double journey and cheap period excursions at the rate of a single fare and a third for the double journey were introduced in August. The general public has shown great appreciation of these facilities. Opportunities were given to travel to all holiday resorts and even the continent. The railways have been quick to take advantage at any occasion to give special excursion attractions such as football games, midsummer sales in the London stores, horse races, etc. The latest excursion is being offered to Irishmen in England desiring to go to Dublin to celebrate the settlement of the Irish question.

The Coal Strike

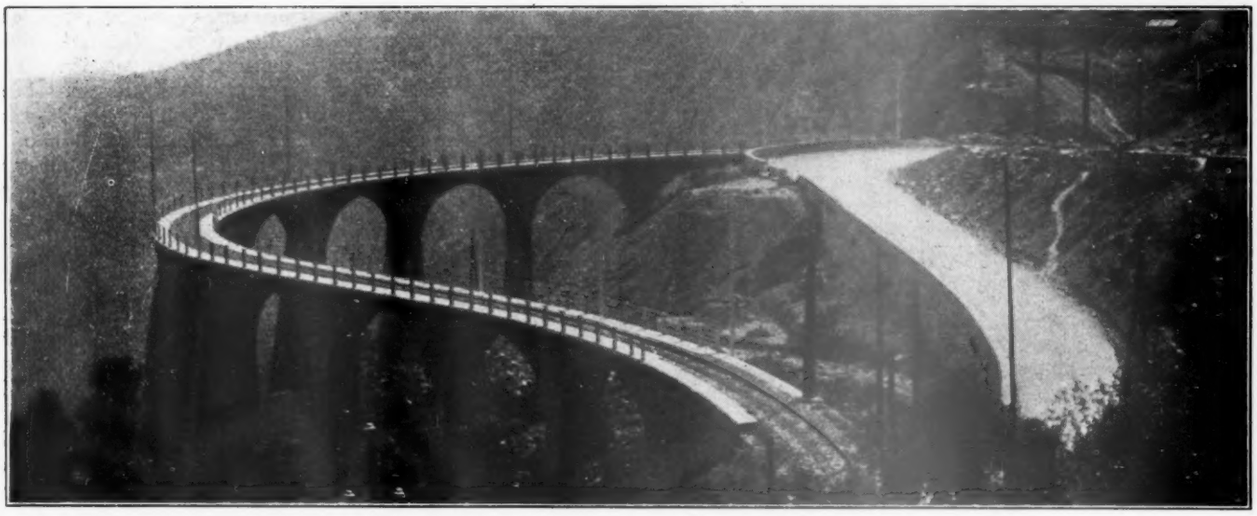
The three-months coal strike was a severe blow to the railways, but coming as it did before the roads were passed back to their private owners, the government was called upon to stand the heavy financial losses it entailed. The railways themselves, however, were not wholly freed from its disastrous results for it so crippled England's trade as to have made itself felt even up to the present time. The situation was such that coal had to be imported into Great Britain from France and even from America for the operation of trains.

Passenger traffic was greatly reduced much to the discomfort of travelers; of freight traffic there was practically none, for the strike was so all-inclusive in its effects that industries could not operate. One interesting development was the rapid and extended use of oil fired furnaces both on locomotives and in stationary plants.

During the strike the threat to call a general strike, including the railwaymen and transport workers, provided a very delicate and dangerous situation, and it was only the unreasonableness of the miners themselves that prevented such a possibility. The action of the railway workers at that time in refusing to join with the miners when the miners refused to meet the government halfway indicated an awakening of labor in general to the futility of maintaining a high-handed policy in endeavoring to extract from the nation that which economic conditions would not allow. If the more conciliatory spirit that has recently shown itself amongst the laboring classes is at all due to the lesson learned during the coal strike some benefit has resulted from it. It at any rate proved that unionism, no matter how strong it may be, cannot hope to win against economic conditions.



Great Northern Railway (England) Three-Cylinder Locomotive for Fast Freight Service



A Viaduct in Southern France Made Necessary by Sharp Curve—Photo by Kadel & Herbert

High Lights in the French Railway Situation

Devastated Lines Restored—Deficits Still Heavy But Decreasing—New Railway Act

By M. Peschaud
Secretary, Paris-Orleans, Paris, France

THERE ARE, in round figures, about 24,855 miles of French railroads, divided into seven railway systems. Five of these railways (Paris-Orleans; Paris, Lyon & Mediterranean; Nord; Est, and Midi) are conceded to private companies by the state, which remains the owner. These concessions expire between 1950 and 1960. The two other railways are the State Railway, founded in 1878 and enlarged in 1908 by the repurchase of the Ouest Company, and, since the end of the war, the Alsace-Lorraine railways, which are also operated by the state. The new convention for the reorganization of the railways, which was passed by parliament on October 29, 1921, provides that the Minister of Public Works may, at any time, decide that the Alsace-Lorraine railway shall join the joint organization.

THE FRENCH RAILWAYS are fast returning to normalcy. Their deficits are still large and wages high but with the new railway act in force and a modification of the eight-hour day it is anticipated a great improvement will be made in 1922. Wages are to be reduced with a reduction in the cost of living. The state under the new law will assist the railways with capital.

Physical Condition

The war imposed a considerable strain upon the French railways. The wear and tear of the permanent way and equipment was considerable, and above all there had to be taken into account the havoc caused by the Germans on the Nord and Est railways. There were 1,802 miles of line destroyed or damaged, besides 3,480 miles of single line (namely a third of the total length worked by these two railways in 1913); also 1,510 bridges, 12 tunnels, 590 buildings and 150 water tanks were demolished. The shops at Hellemmes, Lens, Tergnier, Epernay, Roye, Mohon and all the engine houses in the zone of occupation had to be rebuilt. At present everything is restored and working as it did in 1914.

The other railways did not have such a heavy task in repairing their plants. They were obliged, nevertheless, to re-lay about 746 miles of track which had been taken up during the war so that the rails could be used at the front. It was necessary also to renovate the tracks whose upkeep had been neglected on account of the war, renew the ballast, ties and rails. This work is now, at the end of the year 1921, almost complete. At the same time the railways have carried out certain improvements which experience has proved to be valuable. The dispatching system has been adopted in various places. In addition trials of new signal systems are being actively conducted.

The reconstruction of the rolling stock, which has been very rapid, is also nearly completed. As a result of purchases, and also delivery of equipment which the terms of the armistice required from Germany, the railways possess about 1,000 more locomotives than before the war (an average increase of 6 per cent). They have also an addition of 50,000 freight cars (an average increase of 15 per cent). A great effort was made to repair the equipment. The railways went chiefly to private firms for their supplies, and in spite of the strikes of 1920 and the strict application of the eight-hour act, the situation can be regarded as fairly satisfactory.

For example, one of the principal French railways repaired, during the period from November 1, 1918, to June 30, 1921, both in its own workshops and those of private firms, 2,720 passenger cars and 863 baggage cars, and, in its own repair shops alone, nearly 200 passenger cars and

177 baggage cars. Over 200,000 freight cars have been repaired.

As for the locomotives, the percentage laid aside for repairs, which was 18.4 per cent on this line on December 1, 1918, is now 16.6. (It was 13.5 in 1913.)

The situation is thus normal again on almost all the French railways as regards freight cars; and will soon be so as regards passenger cars. If the locomotive situation is not quite so good, the reason is that private firms were not able to give the same help in this respect as in the case of the cars; also because the eight-hour act necessitated an increase of about 17 per cent in the number of locomotives. The locomotive situation is expected to become normal again by the end of 1922.

Traffic

Transport of Passengers. On the P. L. M., P. O. and Midi, the passenger train miles have increased from 87,611 miles in 1918 to 146,648 in 1921, being an increase of 67 per cent. At present they are 70 per cent of the pre-war runs. The trains are running regularly again, although the expresses, being fewer, are heavier than before the war. Mishaps en route have decreased in the following proportions:

	Breakdowns	Loss of time	Total	Average per 100,000 miles
July, 1913.....	29	138	164	4.45
Oct., 1918.....	72	289	361	13.60
May, 1921.....	19	48	67	2.48

The situation is therefore even better than in 1913. The same can be said as to train delays. In the matter of speed, it has not yet been possible to return to the pre-war standard, owing to inexperience on the part of the new staff, the bad quality of fuel and the condition of the tracks. But there has been an improvement over 1918, as the following examples show:

	Pre-war	At the armistice	In 1921
Paris-Bordeaux	8 hr. 35 min.	9 hr. 41 min.	9 hr. 3 min.
Paris-Nantes	6 hr. 7 min.	7 hr. 0 min.	6 hr. 58 min.
Paris-Montlucon	5 hr. 34 min.	6 hr. 55 min.	5 hr. 45 min.

It should be noted that these improvements have been attained in spite of the considerable increase in the number of passengers carried. On the five private lines this number rose, in spite of increased fares, from 334 million in 1919, to 380 million in 1920.

Freight Traffic.—The freight traffic has been normal again for a year, in spite of the terrible transport crisis which oppressed the country so heavily in 1919 and the first half of 1920. All restrictions on freight, the system of priorities in particular, have completely disappeared, and the railways now accept all freight.

The daily car shortage is normal. In consequence, the daily average car loadings have increased. On all the railways it was 27,000 in November, 1919, and it reached 37,000 in November, 1920. It would be higher at present if the amount of traffic had not decreased because of trade conditions. The number of freight trains in use is near the pre-war figure. On one of the principal railways, for instance, it is 832 (885 in 1913). These trains, moreover, run longer distances than in 1913 and draw more tonnage, which shows that the rolling stock is being more extensively used than before the war. On one railway, the daily mileage is 33,554 as against 29,827 in 1913, and the tonnage carried is 20 million tons as against 17 millions before the war.

The carrying of freight by express trains has proved very satisfactory. These trains run regularly and ensure the satisfactory transportation of early vegetables and fish, in spite of the very great increase of tonnage. On the P. L. M. the dispatches were particularly large in May, June and July, 1921, during which months the Paris station received 50,000 tons of goods for the markets, as compared with 48,000 in 1920, and 32,000 in 1913.

Electrification of New Lines

The problem of the electrification of the railways has been under consideration for a long time. The fuel crisis, resulting from the war, has hastened its consideration. The most extensive electrification program which has ever been prepared has been drawn up by the companies who were most favorably placed for using "white coal." It applies to about 5,592 miles of lines, distributed as follows: Orleans 2,082, Midi 1,988, and P. L. M. 1,429. The cost of equipment will be over $500,000,000 at the normal rate of exchange. It will allow the traffic to be increased, and effect a saving of 1,500,000 tons of coal per year, compared with the 1913 traffic.

The Orleans Company, by a decree of March 11, 1921, was given permission to use the Haute-Dordogne and its two tributaries for water power. According to the terms of former agreements, the state is responsible for the hydraulic section and the company for the electrical section. Moreover, the company has drawn up a scheme by which it will be able to obtain on favorable terms electric power on the Paris-Orleans and Chateauroux line, and later, as far as Montauban. The company has already given orders for a large part of this program to be put into execution. Normally, electrification as far as Orleans will be completed in about five years.

As regards the Midi Company, the work which was commenced in 1920 is proceeding quickly. If the times stated for the execution of the work and the supply of equipment are adhered to, electric traction between Toulouse and Dax will commence at the end of 1922.

The P. L. M. will commence soon carrying out its program with the Culoz-Modane line and the Cevennes line.

The State Railway is continuing the electrification of the suburban lines west of Paris. The work has been put in hand and there is reason to expect that by 1923 the whole of this suburb will be served by electric lines.

New Construction

The following new ordinary lines are in course of construction:

On the Midi: the trans-Pyrenees lines.
On the P.L.M.: the lines from Nice to the Italian frontier by Sospel (39 miles).
On the Est: the line from Saint-Dié to Saales.

The latter is designed to give better connections between the Est railway and the Alsace-Lorraine railway. It is being carried out by the Est Company on behalf of the state. Part of the line will probably be open to traffic at the beginning of 1922.

Art. 10 of Section I of the new Agreement, ratified by parliament, states that a line not yet conceded cannot be constructed without the permission of the Higher Railway Council. The railways undertake to accept any concessions which may be made to them, beyond the maximum already fixed by previous agreements, up to the amount of:

310 miles in the case of the State railway.
112 miles in the case of the Est railway.
93 miles in the case of the Midi railway.
186 miles in the case of the Orleans railway.
62 miles in the case of the Nord railway.
310 miles in the case of the P.L.M. railway.

The exact amount is to be fixed by the Minister of Public Works after agreement with the railway concerned. Except in the case of special agreements, the state will bear 80 per cent of the cost of constructing new lines and the railway concerned 20 per cent.

The Deficit in Round Figures

The disastrous effects of the war on railway finances are still being felt. Nevertheless the situation has improved since last year and the forecast of the result of the 1921

statement of account, compared with the 1920 statement, is encouraging.

If the deficits on branch lines and capital charges are taken into account, the running of the lines in 1920 showed a total deficit of $601,400,000, distributed as follows:

	Result of running	Capital charges	Total deficit
Private companies	$263,420,000	$183,780,000	$447,200,000
State railway	119,080,000	35,220,000	154,300,000
General total	$382,500,000	$219,000,000	$601,500,000

The exceptional war time indemnities were not included in this figure, nor the bonuses for dependents paid by the state in accordance with the Act of January 10, 1919. If these expenses are taken into account, the 1920 deficit should be fixed at $706,000,000.

The deficits expected in the 1921 statement of account are much less. They are valued, per railway, at the following amounts:

Nord	$56,000,000
Est.	35,000,000
P. L. M.	58,200,000
P. O.	70,000,000
Midi	46,200,000
State	102,800,000
Total	$368,200,000

In order to arrive at the exact situation of the railways, the amount of the cost of living allowances, namely, $64,800,000 should be added to this figure. The exceptional allowances for dependents were paid in 1921 by the companies and are included in the $368,200,000. There will, therefore, be a very definite reduction of the deficit compared with the preceding statement of account.

The approximate deficit for 1922 should be $230,400,000, not including the allowances for cost of living which it has not yet been decided to continue.

Increases of Rates

The rates have not been increased since last year, and the railways have remained satisfied with the two increases of 1918 and 1920.

On March 31, 1918, the passenger and freight rates were raised 25 per cent. This increase was soon found to be quite inadequate because of the continual rise in the cost of wages and of raw materials. Therefore the government, in agreement with the companies, brought in a bill on December 23, 1919, to authorize a further increase. This Act which came into force on February 15, 1920, sanctioned an increase which was to be added to the 25 per cent increase, without, however, affecting the latter. This increase was 45 per cent for the third class passengers, 50 per cent for second class passengers, 55 per cent for first class passengers, and 115 per cent for freight. Since then there has been no alteration in the rates, so that at the present time the increases above pre-war prices are in round figures:

140 per cent for freight (to an average maximum of 180 per cent if the unification of the rates resulting from the abolition of special rates is taken into account).

80 per cent for first class passengers.
75 per cent for second class passengers.
70 per cent for third class passengers.

There are reduced fares for large familites, disabled soldiers and parents of soldiers who have been killed in defending their country. Families in which there are three or more children under 18, receive on a request from the head of the family, a strictly personal untransferable identity card for the father, mother and each child under 18, which entitles them to the following reduction of fares:

30 per cent for families of 3 children
40 per cent for families of 4 children
50 per cent for families of 5 children
60 per cent for families of 6 children
70 per cent for families of 7 children and upwards.

The companies and the State railway grant a second class pass to the widows, ancestors and descendants of the first and second degree, or in default of these, the brother or sister of a soldier who has died for his country, allowing them to make a journey free of cost from their home to the burial place provided by the military authorities.

Special season tickets, called workers' three class season tickets are given to every worker, employee or laborer who can show that he is obliged to travel backwards and forwards every day between his home and place of business.

Present Wage Situation

The increase in the wages which commenced in 1918 has continued during 1921. These have reached $644,200,000 for the six railways (excluding $104,600,000 of cost-of-living bonuses paid by the state), being an increase of 340 per cent compared with 1913. This increase is explained by the increase of staff, due principally to the application of the eight-hour Act, and to the introduction of a new scale of wages in 1920.

Photo by Kadel & Herbert

St. Lazare Station, Paris

For the whole of the railways, the cost of the eight-hour day has been rated by the Minister of Public Works at a total of $220,000,000 a year. The financial burdens resulting from this Act are all the heavier because of the fact that the eight-hour act was applied on terms which do not sufficiently take into account the special nature of the employees' duties, which consist in the greater number of cases, more of attendance than of actual work. Owing to this new regulation, there has been a decrease of 30 to 40 per cent in the output of work, to make up for which the number of employees has had to be increased by 103,000.

Since 1920 new scales of salaries have been imposed on the company by an official commission. These scales fix the minimum wage at $760, and have considerably raised, as regards the majority of the employees, the salaries they were drawing at the beginning of 1918. Various supplementary allowances are added to the actual salary (such as gratuities, work bonuses, residence indemnities, allowances for dependents), the rate of which has itself been considerably raised, without mentioning the cost-of-living indemnity of $144 borne by the state. The results are, therefore, that the minimum salary of a new employee in the lowest grade of the service is $1,144 if he has no children, $1,276 if he has two children, or about 3½ times the pre-war salary.

Therefore, the average expenditure per employee, which was $434 in 1913 for the whole of the railways, is at the present time $1,528, an increase of 205 per cent. The increase is much larger for new employees, reaching, according to the railway, 280 to 470 per cent for porters and 280 to 580 per cent for track-layers.

Here is, for example, a table of the salaries now being paid by the principal railways to certain classes of employees (married men with three children):

	Track Layer		Porter		Driver		Shop Laborer	
Present salary (All railways)	$1,372		$1,372		$1,902		$1,477	
Salaries by railways on June 30, 1914		Increase (per cent)		Increase (per cent)		Increase (per cent)		Increase (per cent)
Est.	$260	426	$360	281	$670	183	$345	328
State ...	360	281	360	281	696	173	360	316
Midi ...	202	579	252	444	624	204	267	453
Nord ...	340	303	360	281	...	...	...	...
P. L. M.	240	471	240	471	...	...	270	447
P. O....	242	466	280	386	630	201	267	445

The pensions were increased at the same time as the salaries were raised, in a proportion varying between 25 per cent and 100 per cent according to the amount of the pension, by an agreement arrived at on September 13, 1920, between the state and the railways. The financial burden of the pensions has therefore increased, and is made still greater because of the liquidation of a large number of pensions which had been postponed during the war. Finally, the payments made by the railways to the pension funds have increased on account of the rises in salaries and the fact that these were retroactive in character.

Conclusion

The general railway situation has, therefore, definitely improved compared with last year, but it still leaves much to be desired. The deficit has been reduced, and in some directions expenses are beginning to decrease, particularly as regards construction work and fuel.

Apart from a reduction of wages, which has not yet been made on the French railways, but which the government has announced for the next statement of account, it seems possible that a saving of $20,000,000 to $40,000,000 can be made. This calculation is based on the somewhat optimistic forecasts of wages costs owing to the alterations which the railways, in agreement with the Minister of Public Works, have decided to make in the application of the eight-hour Act. Greater economy on this head can only be attained by a less strict observance of the Act and by reducing the wages of the staff in proportion to the fall in the cost of living. But this depends much more on the government than on the companies. It is possible to save on repairs because of the general fall in prices, and also because the number of machines to be repaired will shortly be at normal again.

There is reason to hope that the P. L. M. will soon be able to balance its receipts and expenditures again. The restoration of the devastated districts will provide increased traffic for the reconstructed Nord and Est lines.

But any improvement in the railway situation depends chiefly on the reorganization of the railways approved by parliament. The new agreement will enable the railways to obtain, on much better terms than at present, the large capital they require to improve their plant, increase their stock, carry out the electrification of their lines and secure financial stability until the return of normal conditions. The agreement is a conciliatory measure putting an end to all difficulties of a legal nature between the companies and the state, arising from the war. It strengthens the understanding between the railways and general interests of the country, and brings about a close co-ordination between the railways and their various departments. Further it ensures a certain amount of unity in management, and although the next financial statements will necessarily still present difficulties, the future can be confidently faced.

Catenary Construction and Supporting Bridges in Stations (Switzerland)

The Station at Rome

A Review of the Italian Railway Situation

Heavy Deficits—Poor Track—Dilapidated Equipment—Ambitious Program for Electrification

By Antonio Giordano

THE TOTAL MILEAGE of the Italian railways was—in December, 1920, the last time when data on this subject were published—11,749 miles. In the recently annexed regions, Venesia Guilia and Venesia Tridentina, there are about 528 miles and 326 miles, respectively, which are owned by the Austrain Railway Company "Sudbahn Gesellschaft" but are operated by the Italian State Railway Administration. The question of transferring the shares owned by the Austrain capitalists to the Italian State Administration is under consideration. The Italian State in 1905 took over the railways in Italy and Sicily, with the exception of only very few secondary lines which are still under private ownership, the Sardinian railways being acquired in 1915.

THE ITALIAN railways came out of the war in a sad plight. Excessive labor troubles have not permitted a return to anywhere near pre-war conditions. Equipment is badly needed. There is no money to be spent there—in large amounts—for rehabilitation, extensions and in electrification.

Mr. Giordano's invitation to American capital to invest in the Italian railway supply industries is tempting when the potential market both in and around Italy is considered.

Permanent Way and Equipment Situation

During the war practically no repairs were made to the track or the equipment. The large amount of equipment purchased in the United States was used almost entirely for war purposes and is practically ruined. The old equipment was used for passenger and freight services which were reduced to a minimum. Therefore, the track and equipment require a large amount of repair to bring them back to their pre-war physical condition. The Railway Administration has been so thoroughly occupied with the rehabilitation and repair of the railways in the devastated regions in the north and in the recently annexed regions that it has not been able to give the attention required for the repair of the track in other parts of the state. Furthermore, it is severely handicapped by the lack of finances.

When the armistice was signed the conditions were such that the government found it more feasible to buy new equipment, than to repair the old, in order to meet its needs.

The following is the list of the new equipment ordered:

LOCOMOTIVES AND CARS ORDERED IN THE U. S. A.

December 20, 1918	150	locomotives (already delivered).
December 20, 1918	10,000	cars (already delivered).
December 8, 1919	150	locomotives (already delivered).

LOCOMOTIVES AND CARS ORDERED IN ITALY

December 20, 1918.	24	electric locomotives.
August 30, 1919...	610	passenger cars.
August 30, 1919...	250	baggage cars.
August 30, 1919...	2,960	freight cars.
August 30, 1919...	486	locomotives (steam).
December 4, 1919..	78	locomotives (electric).
January 10, 1921...	50	tank cars.
April 12, 1921.....	183	locomotives (steam).
April 23, 1921....	450	passenger cars.
April 23, 1921....	300	baggage cars.
April 23, 1921....	1,678	freight cars.
June 3, 1921.....	100	tank cars.

A large number of old cars which were used in local services during the war are now lying idle in the repair shops awaiting repairs.

Financial Situation, Rates and Fares

The critical financial condition of the railways is the subject of examination by the government at the present moment. Since 1915 the balance sheet has been showing a loss and

it is reported that for the year 1920-1921 the loss will be $280,000,000, the revenues being about $600,000,000 and the expenses $880,000,000. The freight and passenger rates were increased with a view of reducing the 1920-1921 deficit and eliminating any possibility of a deficit in 1921-1922, but instead of accomplishing its purpose these increases caused a reduction in traffic. During January and February, 1921, the passenger traffic decreased from 23 to 58 per cent as compared to the traffic of November and December, 1920; during the same period freight traffic decreased by about 50 per cent.

Another factor responsible for the poor showing for the past year was the large increase in the number of employees. In round figures the number has increased from 150,000 on June 30, 1914, to 211,000 on March 31, 1921, or an increase of 41 per cent. At present the increase is about 67 per cent. In the year 1913-14 there were 1,243 employees per million train-kilometers and at the present time there are 1,878.

A special committee made up of members of the House of Representatives and members of the Senate, as well as representatives of the government employees, appointed by the government to reorganize the railway administration with a view to reducing expenses, is endeavoring to make a large reduction in the number of railway employees.

The freight rates have been increased by 400 per cent above the rates of 1915 while the passenger fares have been increased, for first-class, 350 per cent; second-class, 250 per cent; and third-class, 120 per cent. A law has just been passed for the reorganization of the freight railway tariff. The old tariff, approved in 1884, had 770 items for the classification of the freight, while the new tariff has only 77. The new schedule follows the Belgian system.

The commercial and industrial organizations of Italy have called the attention of the government several times to the fact that the increase of rates is not having the effect of increasing railway revenue, but on the other hand it does encourage the merchants not to ship by train and the people to restrict their traveling as much as possible. The shippers are using motor lorry routes, which sprang up after the armistice throughout the whole of the Italian peninsula to a large extent as their rates are some 50 per cent lower than those of the railways.

New Requirements of the Railways

The political and economic consequences of the war have changed the currents of traffic in Europe and these changes, as well as the importance the Italian peninsula has acquired on account of its geographical position as a trade link between the western and eastern countries of Europe, makes it imperative to improve Italy's railway facilities. Furthermore, the impetus given the wood, mining and general manufacturing industries as a result of the war can only be maintained and developed by improving the railway facilities. Then there are certain districts of Italy which on account of the increased population require the construction of new lines, additional tracks and facilities.

The Italian Parliament has voted $400,000,000 for the improvement of railway facilities, but even this is not enough to carry on all the necessary work. To assist in the rehabilitation of the railways the government has decided that Germany be called upon to send to Italy, on the reparation account, as much railway materials as possible for these improvements and for the electrification of the most important lines. The Italian industries have strongly objected to this plan of the government and demand that Germany supply the raw materials only, allowing the Italian industries to manufacture the finished product. Otherwise, they say, the iron and the engineering industries will have to shut down.

The industrial organizations are now taking advantage of the large deficit of the Italian railways to point out the necessity of denationalization of the railway system. They claim that if the railways are properly managed they will become the best customer of the Italian industries, and that under private management they will develop more rapidly and grow hand-in-hand with the industries. Furthermore, they claim the treasury cannot continue to meet the heavy railway deficits. By selling the railways to private companies, the national debt would be greatly reduced and the available railway securities would offer a splendid source of investment for the Italian banks and would thus strengthen their position. In the meantime steps should be taken to put both the banks and the treasury in a position to check the invasion of foreign capital which is taking possession of the great Italian firms and industries.

New Construction Needed

Italy is sadly in need of new lines, the most important of which are the following:

Northern Italy:

Cunco-San Dalmasso di Tenda-Ventimiglia
Aosta-Chamberg
Milan-Genoa (direct line)
Mals-St. Moritz (Switzerland)
Calabso-Cortina d'Ampeszo
Verona-Bologna (direct line)

This will total about 1,200 miles.

In the Venesia Guilia the changed political conditions render necessary the construction of a new line between Goivsia and Klagenfurth, avoiding the Jugoslav territory, and thus rendering the traffic between the port of Trieste and German Austria independent from eventual restrictions of the Jugoslav government. Furthermore, a new line will be built between Trieste and Fiume, as well as one between Fiume and Pola totaling about 310 miles in length.

During the recent conference of Portorose the attention of the governments of the countries of the former Austrian-Hungarian monarchy was drawn to the necessity of improving the communications between Dalmatia and Central Europe and it has been suggested to connect Fiume with Zara by a ferryboat service to the islands of Cherso-Veglia-Arbe and Pazo and with a line from Zara to Kuin. The cost of such project would amount to over $100,000,000.

Central Italy.—The requirements in this section are a line between Rimini and Urbino; the construction of a faster line between Florence and Bologna and between Rome and Ancona and Rome and Naples, a total of 932 miles.

Southern Italy.—Here over 1,000 miles are required to connect the interior of the peninsular to the various ports, and the interior of the island of Sicily with the most important commercial centers, Messina and Catania.

Sardinia.—In a government report it is stated that the island of Sardinia has sufficient mineral wealth to cover most of the whole demand of Italy, but its development is rendered impossible by the lack of proper communications. The government plans to establish a new communication between Lombardy and Sardinia through Leghorn and Corsica, which will shorten the route between Italy and Sardinia by 93 miles. Moreover, 621 miles of roadways will be built in Sardinia to connect the interior of the country with the ports.

These are the projects which the government intends to carry out in connection with the construction of new lines and it is expected that they will cover the requirements.

Rolling Stock Requirements

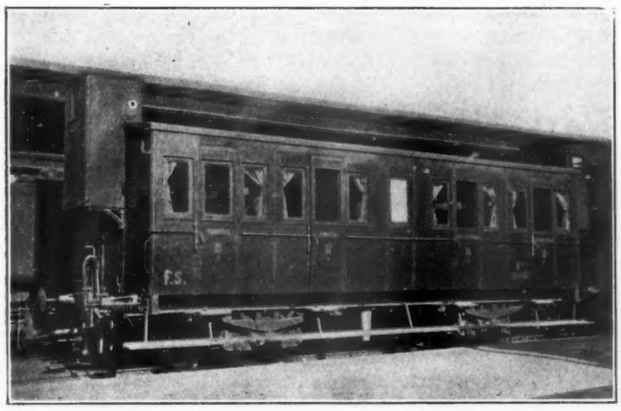
As regards double tracks, it is stated that the Railway Administration has been authorized to build about 3,169 miles of double track, although the needs of the country are estimated to be over 4,970 miles.

The railways are sadly in need of new equipment. The

following table indicates the requirements and the purchases authorized for 1922:

	Requirements	Purchases to be made
Steam locomotives	1,000	576
Electric locomotives	500	298
Passenger cars	1,000	640
Baggage cars	300	250
Freight cars	3,500	2,960

While the large amount of equipment purchased in the United States during the war has given satisfaction there is at the present time but little likelihood of further purchases being made in that country. In the first place, the Italian industries are seeking to obtain the monopoly for the supply of the railway rolling stock to the Italian railways, and in second place the cost of the home product is cheaper than the American equipment because of the rate of exchange. Furthermore, the industries developed during



An "Old Timer" for Second-Class Passengers Still in Service

the war need business to keep them going. While there is not a direct possibility for the sale of American railway rolling stock and supplies in Italy it may be stated that there is the possibility of Americans participating in this business by investing capital in the Italian enterprises.

American capital would be welcomed in the Italian industrial circles, particularly as it would mean Italo-American economic collaboration. With proper development Italian railway industrial plants would be in a position to supply all the countries of Central Europe and the Balkans without heavy transportation costs; at present this market has untold possibilities.

In consequence of the crisis in the shipping industry, especially in Venesia Guilia, the recently annexed regions of Italy, it has been suggested to transform certain of the large shipyards of Trieste (Cantieri di San Marco e San Rocco and the Cantiere of the Stabilimento Tecnico Triestino) into plants for the manufacture of locomotives and cars for exportation to Jugoslavia, Roumania, Austria, etc.

Electrification

A comprehensive electrification program is being developed for the purpose of relieving the fuel situation. Italy having no coal is dependent on foreign countries for her supply; this during the war was a great handicap. The present plans involve some 3,000 miles of line. This work is in a measure dependent upon the development of the hydro-electric power stations. In 1915 there were 329 hydro-electric plants of over 300 hp. each, which produced 935,000 hp. This number was increased to 383 in 1920, with a total capacity of 1,152,120 hp. There are now in process of construction 54 additional plants which will have a capacity of 359,210 hp. This, with the capacity of the smaller plants, will give Italy a total hydro-electric capacity of 1,811,330 hp. Plans have been developed for additional plants to the extent of about 950,000 hp. The government has been delayed in developing the hydro-electric program because of the poor financial condition of the country.

In August, 1920, there were 235 miles of line under electric operation; in June, 1921, there were added 56 miles; it is expected that by June, 1922, another addition of 213 miles will be made, making a total of 504 miles. On January 1, 1922, work involving 521 miles of line will be started in northern Italy, connecting Genoa, Pisa, Florence, and Bologna; recently the electrification of the line between Bologna and Milan (134 miles) was authorized.

Plans are in process of completion for still further large electrification schemes. That which will be in operation by July, 1922, it is estimated, will effect a saving of 1,000 tons of coal per day.

In Northern Italy the system to be used is three-phase at 16 cycles, whereas in Central Italy the system will be three-phase at 46 cycles. In Southern Italy, on the other hand, continuous current will be used.

Competition Between Railways and Other Means of Transport

The government is planning to establish mail and passenger air services but seeks to avoid, as much as possible, the competition with the railway services. These plans for the present are restricted to services between Naples and Sicily and Tripoli and between Brindisi and Corfu.

Competition between sea transportation and railway transportation is limited only to certain Adriatic lines of local importance which do not materially affect the traffic of the railways.

What has hurt the railway traffic most is the automobile services established after the armistice, especially in connection with the transportation of freight. In the Italian peninsula there are 600 automobile lines for passenger service and 200 lines for freight service. The Fiat Auto Company has requested the permission of the government to establish 410 additional automobile lines for passenger service.

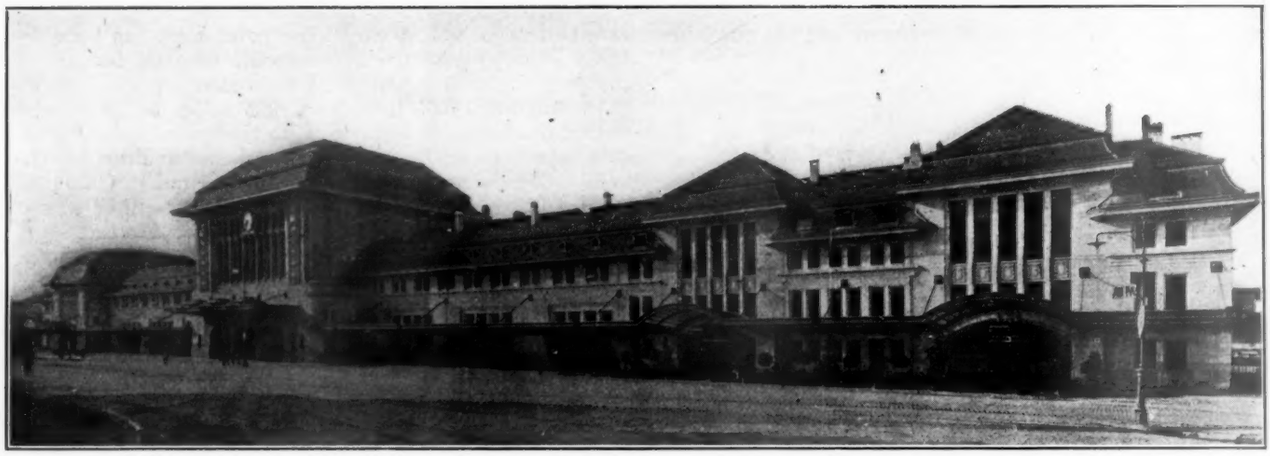
The passenger services compete especially with the secondary railway lines connecting large centers, such as Turin, Bologna, Trieste, Rome, and Naples, with the small villages of the respective districts, while the freight services connect the large cities, such as Turin through Milan to Trieste, Milan and Trieste to Rome, Naples with Rome, etc. Being fast and less expensive than the railway services they are preferred by the shippers.

Labor Organization

There are three organizations of railway workmen in Italy —namely, the Socialist Workmen Organization (Sindacato Italiano dei Ferrovieri) with headquarters in Bologna, the Catholic Workmen Organization (Sindacato Bianco dei Ferrovieri Italiani) with headquarters in Milan, and the National Association of Railway Workmen (Associasione Nazionale dei Ferrovieri Italiani) with headquarters in Milan.

In consequence of the strikes of last year the parliament passed a law authorizing the increase of the wages 400 per cent, establishing a new base between the salaries of the clerks and the wages of the workmen which cut down the great disparity between the two which existed previously.

Railway labor has found the futility of continuously striking and is beginning to realize the true economic condition of the country. At the recent strike in Rome members of the Socialist Workmen Organization remained at work and operated the trains. The government has also taken strong measures against the agitators so that now the labor situation is far better than it was immediately following the war. The government will reduce the number of employees instead of salaries in the endeavor to economize.



The Beautiful Station at Lausanne, Switzerland

The Swiss Railways in the Year 1921

Loss of Traffic Brings Deficits—Complete Electrification Planned—Effect of High Exchange Rate

By Julian Grande

ALTHOUGH Switzerland's population, according to the census of last May, is only 3,883,700, including foreigners, her state or federal railways at the end of 1920 had a total working length of 1,895 miles. Besides the federal railways, Switzerland has the following company-owned lines:

Nature of Railway	Miles
35 standard-gage lines (mainly electric)—total length in miles	549
67 narrow-gage lines—total working length	945
15 cogwheel lines—total working length	73
37 tramways—total working length	303
49 cable railways—total working length	31

The total amount of capital, share and bond, invested in all these different non-state Swiss railways and in tramways amounts this year to $154,860,000. On the federal railways alone last year 39,410 persons were employed—a figure which has just been reduced, for economy's sake, to 35,832, which will mean a saving of $2,000,000 in wages and salaries—a reduction from $45,600,000 to $43,600,000.

The financial situation of both the federal and private lines in Switzerland is serious. For the federal railways the deficits are as follows:

Deficit remaining over from the war and the period immediately succeeding it	$18,747,600
Estimated deficit for 1921 (The original estimate was $9,777,658.)	16,000,000
Estimated deficit for 1922	6,071,000
Probable total deficit at the end of 1922	40,818,600

BECAUSE of the high rate of exchange for Swiss money neighboring countries route traffic around that country to escape paying rates in Swiss currency. For the same reason the tourist travel, which before the war was a large source of revenue, is greatly reduced. Swiss rolling stock and road bed are in excellent condition compared with the neighboring countries. Electrification is progressing despite the difficult financial condition.

Rate Increases Do Not Bring Increased Earnings

The Swiss railway receipts for the first seven months of 1921 compared with those for the corresponding period of 1920, show that the passenger traffic receipts, despite greatly increased fares, which have driven more than 90 per cent of passengers to travel third-class, rose only about 3 per cent (from $26,780,000 to $27,600,000). This increase applies to *all* lines: the increase for the federal railways is still less.

The following figures show the position of the Swiss federal railways from January to the end of October in 1920 and 1921:

	1921	1920
Passenger receipts (January-October)	$21,361,285	$21,139,959
Freight receipts (January-October)	34,833,968	43,542,240
Total receipts (January-October)	$56,195,253	$64,682,199
Total operating receipts (January-October)	$58,397,800	$66,670,143
Total operating expenses (January-October)	55,945,863	57,154,564
Net operating revenue (January-October)	$2,451,937	$9,515,579

The results, therefore of the first ten months' working of the Swiss federal railways in 1921 are worse than those of the corresponding period of 1920, which was considered such an unfavorable year from the railway receipts standpoint. The returns of the federal railways per mile are less up to October, 1921, than they were during 1920.

Bad as is the financial situation of the Swiss federal railways, however, it is not relatively so bad as that of many other European railways. Indeed, it is better, as the following table will show:

Railway	Mileage	Deficit at end of 1920
Paris, Lyon & Mediterranean (France)	6,027	$120,000,000
State railway (France)	5,592	154,000,000
State railways (Italy)	9,321	210,000,000
State railways (Belgium)	2,734	36,000,000
German railways	34,175	3,250,000,000

The Privately Operated Lines

As regards the private-owned lines in Switzerland the situation is not much more satisfactory. The following were

the decreases or increases in receipts during the first eight months of 1921 as compared with the corresponding period of 1920:

Privately-owned Lines	
Standard-gage lines, decrease	4.8 per cent
Narrow-gage lines, decrease	.6 per cent
12 cogwheel lines, increase	34.5 per cent
40 tramways, increase	.1 per cent
46 cable lines, increase	5.8 per cent

The main reasons for the general decrease in the receipts of Swiss railways are, besides the high cost of materials, and especially coal, the increases in wages and salaries found necessary because of the rise in the cost of living, the unsettled state of Europe, and the introduction of the eight-hour working-day. Rails, for instance, rose greatly in price, making it harder to keep the lines in good working order. Rails cost $34 per ton, f. o. b. Basel, in 1913, but during the war the cost increased to $100 and even $120. During the war Switzerland had to carry her own freight from Mediterranean ports, and consequently had to add considerably to the number of her freight cars. These numbered 19,300 in 1913, and 25,000 in 1920. Before the war a steam locomotive cost 14.5 cents per pound. During the war this rose to 72.5 cents. Coal and railway material generally are now falling considerably in price here, but are still much dearer than before the war.

Decrease in International Traffic

What, however, has really caused the Swiss railways in general so much loss is the enormous decrease of international traffic, due to unsettled conditions. Switzerland is a natural European railway junction, and, under normal conditions, a highway of trade across Europe in all directions. Freight between Belgium and Italy, Germany and Italy, and to a great extent also between Northern France and Italy used to be carried over the St. Gotthard line. Now, with the decrease of commerce and the abnormally low value of the money of Germany, France, Belgium and Italy, these countries find it more advantageous to transport their merchandise by a much more circuitous route, or even by sea, thus avoiding having to pay Swiss railway freights in Swiss francs.

Again, a very large amount of passenger traffic used to pass through Switzerland, besides which the Swiss inland trains used, especially in summer, to carry very considerable numbers of passengers. It is estimated that, before the war, some 4,000,000 tourists annually visited Switzerland. Now only a very small proportion of this number are able to visit the country, mainly because of the high exchange.

Motor Car Competition Serious

Before the war the average American visitor to Switzerland traveled first-class, and he could, and often did, buy a fortnight's first-class ticket, available on all the Swiss federal railways and on the lake steamers, for only $20, and a monthly ticket for $30. During the war these general season tickets, as they were called, were abolished, and they have not since been reintroduced, except for a minimum period of three months, and at a cost of $120, which is almost exactly double the pre-war price.

The result of the greatly increased fares and the much reduced and much less convenient train services is that Americans travelling three or four together have lately often found it cheaper and far pleasanter to buy a motor car in France and tour through Switzerland in it, thus avoid using the railways.

But it is not in passenger traffic alone that the results of the war have affected the receipts of Swiss railways. The competition of motor vans and motor lorries with the railways for the conveyance of heavy freight in Switzerland has become very serious. In 1914 there were only 751 such vans in the country; at the end of 1920 there were 3,331, and the number of motor vehicles of all sorts is greatly and constantly increasing. Most of the railways and nearly all the lines of commercial importance being state-owned, it has not been so easy for them to introduce their own railway motor van services as it would have been in the case of privately-owned lines because of the red-tape involved. Consequently, private companies have introduced motor van transport into Switzerland, and these companies are already of considerable importance, with much capital behind them.

All that the State Railways Department has done hitherto is to ask the government to prevent motor van companies from competing with them, but it naturally can hardly do that. At present the railways cannot compete with the motor van transport companies if only because they have to maintain, not merely freight offices at every railway station of any size, but also because they have to keep the permanent way in order, and motor vans do not have to keep the roads in order nor maintain such a large staff of clerks, etc. Finally, they are not, as are the railways, bound by the eight-hour working day law.

The Swiss postoffice is also inaugurating a motor van service for the transport of mails and parcels within certain areas formerly served by the railways. An aerial mail service has been tried in Switzerland, but it was abandoned as being too expensive. On the other hand a passenger and mail service between Paris and Lausanne has just begun. Finally, petroleum was during the war and until a few weeks ago a Swiss government monopoly, which made it much more expensive than it would have been if sold privately. This will also cheapen transport by motor vans, motor cars and aeroplanes.

Electrification

The Swiss federal railways hope electrification will enable them to put their finances upon a sounder basis. Switzerland has no coal mines, and has always bought coal from her immediate neighbors, mainly Germany and Belgium, although during the war she perforce bought it often from England and even from the United States, but at prices which rose from $5.40 a ton in 1913 to $38 per ton in 1920. The 1913 federal railway coal bill was $3,507,400, but the estimated expenditure on coal (which has almost certainly been exceeded) for 1921 amounted to $21,060,000, and yet coal has greatly fallen in price.

For this electrification work Switzerland was obliged, in 1920, to raise a loan in the United States of $60,000,000 at 9 per cent interest. At the time of raising the loan it was stated that this sum was to be spent solely on the purchase of electric plant in the United States, on building electric power stations, and generally on continuing the work of electrification of the Swiss federal lines. A good deal of copper wire and certain electric cables were bought in the States, but since the German mark has fallen so much in value Switzerland has naturally turned to Germany to purchase there such of her railway requisites as she cannot produce herself.

The first of the federal railways to be electrified was the St. Gotthard line, 139 miles long, running from Lucerne to Chiasso, on the Swiss-Italian frontier, and traversing the St. Gotthard tunnel, 9¼ miles long. This line, it is expected, will be entirely electrified by April next, and already trains with electric traction are running from Erstfeld to Bellinzona. The locomotives, which have been built in Switzerland, cost $200,000, or exactly twice as much as they would have cost before the war.

At present about 33 per cent of the entire network of the Swiss railways, federal and other, is electrified, or about 1,200 miles altogether. Single-phase alternating current is used in most every case. The cost of transforming a railway from steam to electric traction, however, is very considerable. The original estimate for the cost of electrifying the St. Gotthard line from Erstfeld to Bellinzona, through the tun-

nel, was $7,700,000, plus about $400,000 for repair shops; but the sum hitherto expended can hardly be less than $20,000,000. It is difficult to estimate what the electrification of the entire St. Gotthard line will ultimately cost because the iron bridges have all proved too weak for the heavy electric locomotive and trains, and 60 of the smaller bridges have accordingly been reinforced by reinforced concrete, with a layer of ballast; the large iron bridges have to be either strengthened by arches underneath or be replaced by stone bridges, as has already been done in the case of nearly 20 bridges.

The number of electric locomotives at present used on all the electrified Swiss railways is about 50, but there are still 1,100 steam locomotives in use. The electrification of all the Swiss railways, broad and narrow gage, is expected to be completed within 12 years.

What it will mean to the federal railways alone to be able to use electric traction on all other lines may be gaged from the fact that in 1919 about $15,800,000 out of the total expenditure of $58,178,400 (or about 24 per cent) was for coal alone, and that with a still reduced train service. The total capital required for the electrification of the entire Swiss railway system, including power generating stations, is difficult to estimate, and will depend very much upon the waterfalls selected for the production of electric current; an outside estimate is $100,000,000.

The question whether it will be cheaper to run the Swiss railways electrically than by steam is somewhat disputed; but since 1911 it has been proved that the cost of the electric energy used by the Lötschberg line was about two-thirds of what steam power would have cost.

Private Lines in Difficulties

The Lötschberg line, a privately-owned company, is also in financial straits, due to the war. On December 31, 1920, its total debit balance was $4,349,514. Although a link between Eastern France and Italy, via the Simplon Tunnel, it depends much on local business and tourists. The original capital for its construction was mainly subscribed by France, but the Swiss government took advantage of the low-value of the French franc in 1920 to buy back 40 out of 44 million francs worth of Lötschberg bonds to bearer from the French. The ordinary share has been reduced 50 per cent and the preference share capital 20. Very badly hit by the war, this line began again in October, 1920, to pay some interest on its bonds. A misfortune with which it has to contend is that on the south side traffic has been frequently disturbed by avalanches and landslides. Experts consulted could only advise constructing two additional tunnels, one nearly two miles long, the other about 1,180 yards long, besides which a number of barriers and other constructions are necessary to hold up stones and rocks from the slopes above and generally prevent the line being blocked.

One of the Tragedies of Railway History

As for Swiss private mountain railways, the Bernese Oberland lines, which come largely within the category of tourist lines, have been electrified since 1914. The story of the Jungfrau Railway, the highest mountain railway in Europe, is one of the tragedies of railway history. Before the war it paid 5 or 6 per cent, but now it has become so deeply involved in financial difficulties that the share capital of $900,000 is being reduced to $360,000 by writing off, and various proposals are being made to the bondholders (bond capital $1,400,000)—proposals which may perhaps save the railway from bankruptcy but will not fill the bondholders' pockets.

Another semi-tourist line which is virtually bankrupt this year is the Furka Line, with debts exceeding $6,000,000, and share capital amounting to $1,600,000.

A privately-owned line, the Rhaetian railways, which runs to St. Moritz and Davos and the Engadine generally, is already partly electrified, and it is hoped that by June 1, 1922, the entire line of 173 miles will be in electric operation. The total cost of the electrification of this line will probably be about $1,800,000.

The development of electrification work in Switzerland is hindered by the increased cost of material and labor. Before the war all the canalization and blasting as well as masonry work were done by Italians, who used really to be the tunnel builders of the Alps; but now the emigration of foreign labor into Switzerland is severely restricted, and instead of Italians, Swiss have to be employed, who are less skilful at this kind of work.

Nationalization Does Not Pay

The construction of most of the power stations intended to supply electric current to railways has to be done by the federal railways, and experience has shown, at any rate in this country, that government management is the most expensive management. The war has revealed to the Swiss—what they were already suspecting—that nationalization does not pay. No country has given nationalization so thorough a test as Switzerland, and nowhere is there now so powerful a movement on foot towards denationalization. At the beginning of 1921 Switzerland actually had 171,623 federal and federal railway officials. In other words, almost exactly one in every 22 of the country's population, including foreigners, was either a civil servant or a state railway official.

Campaign Launched

So profoundly disgusted have the Swiss public become with the results of state railway management, that a campaign was recently launched, asking Parliament to hand back the state railways to a private company. A special parliamentary committee has been appointed to consider Swiss federal railway re-organization. It was not long before it decided to reduce the number of members of the Board of Management of the federal railways from 55 to 11, and the number of railway districts and district managerial offices from five to three. The result will be that Switzerland will be rid of a great many superfluous officials, and it is estimated that salaries amounting to no less than $1,000,000 will be saved.

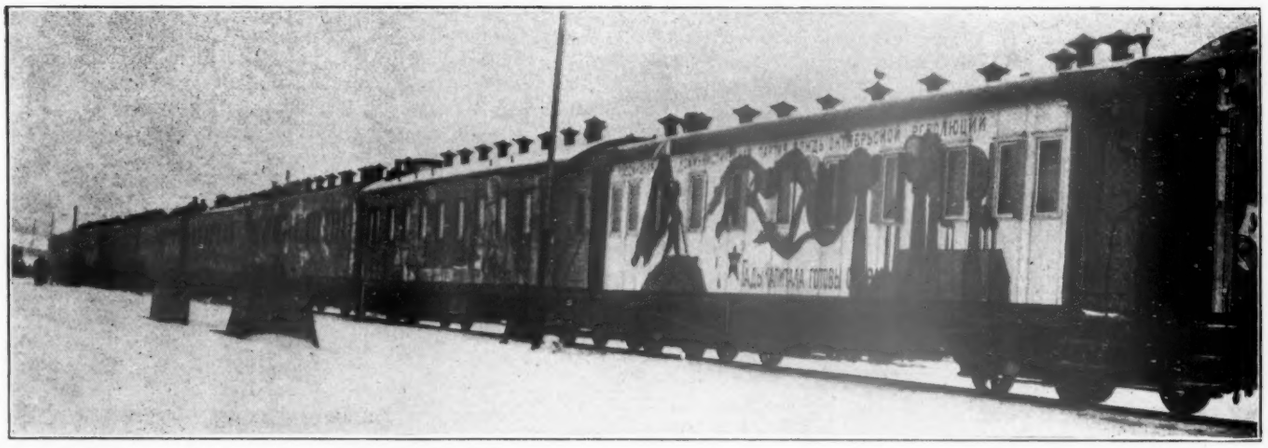
New Work

It is doubtless owing to Swiss federal railway indebtedness that the 1922 estimates, just published, include only $230,000 for new lines, of which about $200,000 is for the second Simplon tunnel. The following are the other principal items on the 1922 federal railway estimates:

New rolling stock (Nearly $2,500,000 less than in 1921)	$5,277,800
Electric locomotives	4,182,000
Six motor vans	60,000
Sixty third-class passenger cars	518,800
170 freight cars	391,000
Constructions account generally (About $1,400,000 less than in 1921)	22,547,168

Despite the general outcry about lack of capital for embarking on any new enterprises, engineers have been studying the question of piercing yet another great Alpine tunnel through the Splügen, which would greatly shorten the distance between Central Europe and the Adriatic and Italy. Naturally those interested in the Simplon and Gotthard lines are much alarmed at this new project, especially as the second Simplon tunnel is now completely masoned over and the electric installations are being fitted up.

Although the Swiss railways were severely tried financially by the war, nevertheless in one sense they have not come out of it badly. The rolling stock, generally speaking, has deteriorated little, if at all, and the permanent way is in good condition. The Swiss railways, however, cannot fully recover financially until Europe recovers.



A Bolshevik Propaganda Train—Photo by Kadel & Herbert

Soviets Demoralize Already Inadequate System

Russia's Railway Mileage Has Decreased Since Revolution —Equipment in Sorry Condition

By Dr. J. M. Goldstein
Professor of Economics, Institute of Industry and Trade and University of Moscow

UP TO THE BEGINNING of 1890 the railroad mileage of Russia developed slowly, as can be seen from the fact that up to the middle of 1890 the whole mileage of European Russia, including the Caucasus, hardly reached 26,700 versts (17,800 miles). By comparing the mileage of Russia of those days with the mileage of the United States at the same period we find that the mileage of Russia was hardly equal to one-ninth of the railroad mileage of the United States, notwithstanding the fact that Russia's area was about two and one-half times greater than the area of the United States.

Show Growth in Mileage

Because of a change in the financial and economic policy of Russia, chiefly due to S. V. Witte's taking charge of the finances, the country's mileage quickly rose, as can be seen from the fact that at the end of 1907, i. e., during a period of 17 years, the railways of European Russia, including the Caucasus, increased 85 per cent—to 49,000 versts. The amount of railroad freight traffic had increased still more by that time, as can be seen from the following computations:

Years	Railway mileage	Metric tons carried one mile (billions)	Tons carried one mile per mile of line (millions)	Tons carried one mile per inhabitant
1880	14,070	5.0	0.36	60
1890	17,800	9.3	0.52	92
1895	21,000	14.0	0.66	130
1906	31,870	26.7	0.84	200
1913	35,000	41.9	1.20	283

The density of traffic thus increased from the beginning of the eighties by 3½ times, and the number of ton-miles per inhabitant increased approximately 5 times in 17 years.

Still faster grew the mileage for that period in Asiatic Russia, as may be seen from the fact that the mileage increased there from about 900 in 1890 to about 10,000 miles in 1914 (not including Russian Chinese Railway).

For the whole of Russia (excluding Finland) the increase in mileage during the following five years' period amounted to:

Years	Total increase of mileage, miles	Annual average increase, miles
1860-64	1,378	276
1865-69	4,445	889
1870-74	4,962	992
1875-79	2,290	458
1880-84	2,028	406
1885-89	2,874	575
1890-94	3,892	778
1895-99	9,924	1,985
1900-04	5,482	1,096
1905-09	4,196	821
1910-14	2,310*	462

*Approximately.

The railroad construction reached its maximum during the decade from 1895 to 1904. During that period about one-third of all the mileage existing in European and Asiatic Russia at the beginning of the World War was built and opened for traffic. How relatively small these maximum figures were in comparison with the railroad building in the United States, or even Canada, is sufficiently shown by the fact that in the United States in the single year 1887 there were 12,800 miles of new railroads opened for traffic, and in Canada in the single year 1915, about 4,800 miles of new railroads.

The Situation When the War Began

At the beginning of the war, of the total of 46,600 miles of railroads existing in Russia (excluding Finland), the state owned about two-thirds and private companies about

UNDER THE REGIME of the Soviets the railway situation in Russia is steadily progressing from worse—it was already bad—to utter demoralization.

Mileage has been decreased by the formation of a number of independent states. Maintenance of both equipment and permanent way is practically at a standstill —even retrogressing.

An end to Soviet rule and the intervention of foreign capital seems to be the only hope.

one-third. Besides this, at the beginning of 1915 there were under construction about 9,400 miles of private and state trunk lines, 3,800 miles of which were in Asiatic Russia. At that time there were further outstanding franchises for the building of 6,200 miles of new roads. Most of these were to have been built immediately. Furthermore, there were under construction more than 310 miles of feeders and about 40 miles of small local lines.

Thus, had there been no war and revolution the mileage of Russia's railways, including those of the new formed border states, would have reached at the end of 1921 at least the 60,000 or 65,000 mark.

Formation of Border States Has Decreased Mileage

The formation of a series of independent border states, such as Latvia, Esthonia, Lithuania, Poland, etc., has greatly diminished the mileage of Soviet Russia, because in these areas the density of railroads was greatest. No wonder therefore that, according to official figures of the Soviet government, the mileage of European Russia comprised only about 32,000 miles in 1920, i. e., it had *decreased* 25 per cent since the beginning of the war. At the end of 1921, in view of the fact that there was no new construction, the mileage remained probably, at least nominally, the same. However, not having replaced the old worn-out rails by new ones, the mileage actually in working condition should be much smaller.

The Equipment Situation

Still worse is the situation of the railroad equipment. The American Relief Administration having sent railroad experts to Russia in connection with shipping of foodstuffs to the famine stricken areas, has received a report to the effect that water transportation is used wherever available for shipping food supplies to points in the famine districts, particularly along the Volga and Kama rivers. In the same report the American Relief Administration, quoting official papers of the Soviet government, states the following about the railroad equipment:

"Out of a total of 19,106 locomotives in Russia in good condition before the war, there were last August from 5,500 to 7,650 reported in working order by different authorities, or a decrease in motive power of from 60 to 75 per cent. Of that number about 1,000 were idle owing to lack of fuel. Serviceable cars were reported at from 150,000 to 286,000, a decrease of from 48 to 70 per cent of the pre-war number.

"The roadbeds were stated to be in very bad condition, necessitating extensive repairs if large sections were not to be closed to traffic. According to one estimate at least 25,000,000 ties had to be replaced with a program that called for only 5,000,000 replacements. Considerable mileage *of branch lines had been removed and used for repair material.*

"A decrease in production of coal by 80 per cent and the deterioration of the mines rendered the fuel situation serious and forced the railways to depend much more upon wood. This wood comes from the forests of northern Russia—a long haul to supply southern railways. An effort was made to change locomotives on the southern railways into oil burners, but the gradual decline of oil production retarded this.

"On August 10 last," according to Economic Life, official paper of the Soviet government, "out of 437,152 freight cars listed, 122,007 were 'sick' cars, i. e., utterly unfit for any use, and only 195,595 cars registered as in working order.

" 'But of this latter number,' it is explained, 'no more than 20,000 were really first-class cars, i. e., in a condition to carry loose grain and potatoes. At the most conservative estimate, at least 60,000 such cars would be required for transport during the ensuing season.'

"The situation had been growing worse up to August, 1921, it was shown, for in January, 1921, there were 463,397 cars registered, of which 96,960 were 'sick' and 294,124 in working order."

Later communications in the Economic Life of September 25, 1921, do not picture the situation in brighter colors:

The results of repair work completed on railway engines during August, states the official paper, fell considerably short of the program; the quality of the work done and the speed of production at the railway workshops has been constantly going from bad to worse. This decrease in production was caused by the same usual reasons: Lack of food supplies, materials, tools, and machinery, etc. The laborers because of lack of food fail to come to workshops, and the number of absentees has increased to such an extent that the problem is becoming more complex every day. To judge by the data furnished by 12 railways for the month of July, this absenteeism reaches only the average 30 per cent. This tendency has been more manifest on the South-Eastern Railway, where non-attendance of workmen amounted to 57 per cent; on the Tashkent Railway, 40 per cent; on the Syzran-Vjazma Railway, 39 per cent; Moscow-Kursk Railway, 32 per cent; Northern, 31 per cent; Moscow Baltic, 30 per cent.

One of the 500 Tank Cars Built by the Canadian Car and Foundry Company for the Russian Soviet Government

Antique Locomotives the Rule

Speaking of the causes which make the efficient functioning of the railroads of Russia difficult, it is necessary to mention here the following important facts. The majority of locomotives existing in Russia in 1921 were very old, as may be seen from the following data. According to age, all locomotives in Russia can be divided in the following groups:

Over 45 years	10 per cent
30 to 45 years	10 per cent
15 to 30 years	50 per cent
Less than 15 years	30 per cent

About 50 per cent have thus been in use for 25 years or more. It is not strange, therefore, that at the beginning of 1921 about 61 per cent of the locomotives needed more or less extensive repairs, which could not be fully realized due to the insufficient number of workers, as well as to the lack of supplies.

Rehabilitation and the Opportunity for American Enterprise

The complete breakdown of the railroad system of Russia outlined above and the Soviet government's lack of means or credits shows clearly that the restoration of the functioning of railroads can take place only after the appearance in Russia of a more stable government, which, having obtained through an election the support of the whole nation, will be able to secure recognition and financial aid from foreign governments. Splendid prospects will then be opened to American manufacturers of locomotives, cars, rails and other supplies, as well as for American capital in general.

Railway Bridge Over the River Elbe, Germany—Photo by Kadel & Herbert

German Railways Operating Under Difficulty

Heavy Deficits Still Obtain—Physical Conditions Are Improving, Although Far from Pre-war Standards

By G. Reder

WITH FEW EXCEPTIONS all German railways are owned by the state. Till April 1, 1920, they were operated by the different federal states of the former empire but they are now operated as one unit by the state and are known as the "Reichsbahn." This includes 92.2 per cent of the mileage of the country. Of the important companies only the Luebeck-Beuchen Railway, which operates the double track from Hamburg to Luebeck and Beuchen and which owns about 85.75 miles of line, retains its old form. The smaller railways are to a great extent in the hands of private companies, but the state, municipalities and districts are also strongly interested in them.

The state railways are controlled by a Ministry of Transport which is under the direction of the former general manager of the military railways during the war. The ministry is divided into ten sections: Administration, personnel, transport, exploitation, rates, finances, rolling stock and maintenance, machinery and electrification, construction and inspection of other railways.

The total length of the German railways is about 36,000 miles, of which 69.5 per cent have double tracks or multiple tracks. As in all the countries of Central Europe, a great increase in this mileage is not to be expected. The loss of territories through the peace treaty led to a reduction of 2,500 miles in the pre-war mileage.

The latest figures available (1919) show that the total capital investment was 21,320,000,000 marks ($5,330,000,000). The total revenues and expenses (in millions of dollars) for the seven years ending with 1919 are given in the table.

GERMAN railways have experienced most astounding deficits since 1918. Some believe that private ownership is the only solution of the present problem. It is argued that whereas they were successful under an iron-clad monarchy that in a democratic government, such as now obtains, they are doomed to failure.

The railways have all been grouped under one head and considerable progress has been made in improving their physical condition.

Before the war the net receipts from the railways were an important item in the state budget. Although the revenues fell in 1914, due to the diminution of traffic following the mobilization, in the following years they increased with the reopening of the train service. But the deficits came with 1918 and have continued ever since.

The greater part of the locomotives and freight cars were turned over to war purposes. The conquered railway material did not begin to meet the needs of the traffic behind the front. Economical operation was impossible with the reduction in the number of locomotives for home use because of the demands from the front. The quality of coal decreased and where only 7 to 10 per cent ash in the coal obtained before the war it was necessary to accept coal with 25 to 30 per cent ash. Steel fireboxes were used in place of copper, which is foreign to German practice. Shut off from the mineral oil fields it was necessary to use inferior lubricating oil made from tar which increased the number of hot boxes to over 20,000 per month at the beginning of 1920. In 1920, 60 per cent of freight cars were in need of repair.

The labor troubles at the time of the revolution in 1919 and the beginning of 1920 had also

REVENUES AND EXPENSES IN MILLIONS OF DOLARS

Year	Revenues	Expenses	Surplus	Deficit
1913	712.64	499.48	213.16	.....
1914	628.04	503.16	124.88	.....
1915	688.18	497.04	191.14	.....
1916	802.3	578.66	223.64	.....
1917	938.22	778.28	159.94	.....
1918	941.48	1,203.14	.....	261.66
1919	1,602.62	2,413.34	.....	810.72
1921 (estimated)	.....	.....	.....	3,750.00
1922 (estimated)	.....	.....	.....	2,700.00

serious effects on the condition of the equipment. After the war the number of employees on the railways increased to a marked degree. In 1913 there were 740,000 employees and in 1919 this had been increased to 1,121,000; it was reduced to 1,091,000 in 1920. Of course the eight-hour day is responsible for some of this increase. However, with the great reduction in traffic there are far more employees than are necessary.

The depreciation of the mark has had its influence on the increase in expenses, increasing the cost of raw materials from 39 per cent of the total expenses in 1913 to 47 per cent in 1920. One ton of coal cost 13 marks in 1912 and

Photo by Keystone

Station at Cologne, Germany

330 marks in October, 1921, or 26 times more; one ton of rails cost 118 marks in 1913 and 2,277 marks in October, 1921, or 20 times more. One ten-wheel locomotive cost 94,000 marks in 1913 and 1,580,000 marks, in the summer of 1921, or 17 times more.

Restoration of German Railways

The first step taken to replenish the depleted rolling stock after the war was to place orders for repairs with the idle industries and ship yards to keep the workmen busy. The amount of work involved cost some 20,000,000,000 marks ($4,000,000,000 at the normal rate of exchange) and included more than 2,800 locomotives, 3,600 passenger cars and 54,500 freight cars in 1920. This year (1921) there will be delivered about 1,870 locomotives, 3,300 passenger cars and 45,600 freight cars.

To cover the rapid increase in operating expenses several increases in freight rates have been made, the averages being shown below:

1917—pre-war	
October 1, 1917, increase of	7 per cent
April 1, 1918, accumulative increase of	23 per cent
April 1, 1919, accumulative increase of	93 per cent
October 1, 1919, accumulative increase of	195 per cent
March 1, 1920, accumulative increase of	491 per cent
December 1, 1920, accumulative increase of	580 per cent
April 1, 1921, accumulative increase of	1,022 per cent
November 1, 1921, accumulative increase of	1,359 per cent

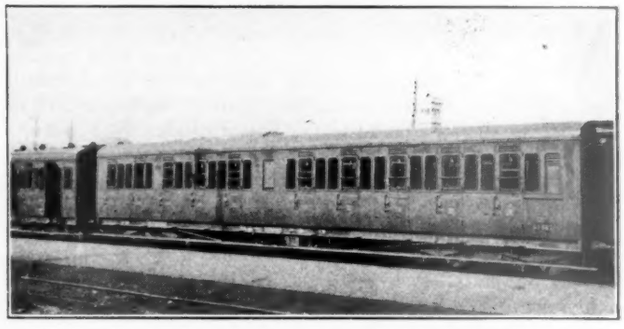
Regardless of this increase it has not been possible to meet expenses and endeavors are being made to reduce expenses by increasing the capacity of shops. To this end time studies are being made and detailed cost accounting introduced. Standard rolling stock has been designed to permit of greater production and there has been no hesitancy in the application of improved devices such as superheaters, feedwater heaters, etc., which will reduce the cost of operation.

Present Conditions

The situation at present is improving. The trains are running more regularly and the passenger service has materially improved as compared with two years ago. The speeds have increased but are still under what they were in 1913. For instance from Berlin to Frankfort the express-train time in January, 1921, was 10 hr. 37 min. instead of 11 hr. 26 min. as in 1919, and which corresponded to an average speed, including stops, of 33 m. p. h. and 30.5 m. p. h., respectively. In 1913 it was 7 hr. 8 min. (corresponding to 49 m. p. h.).

Future Development

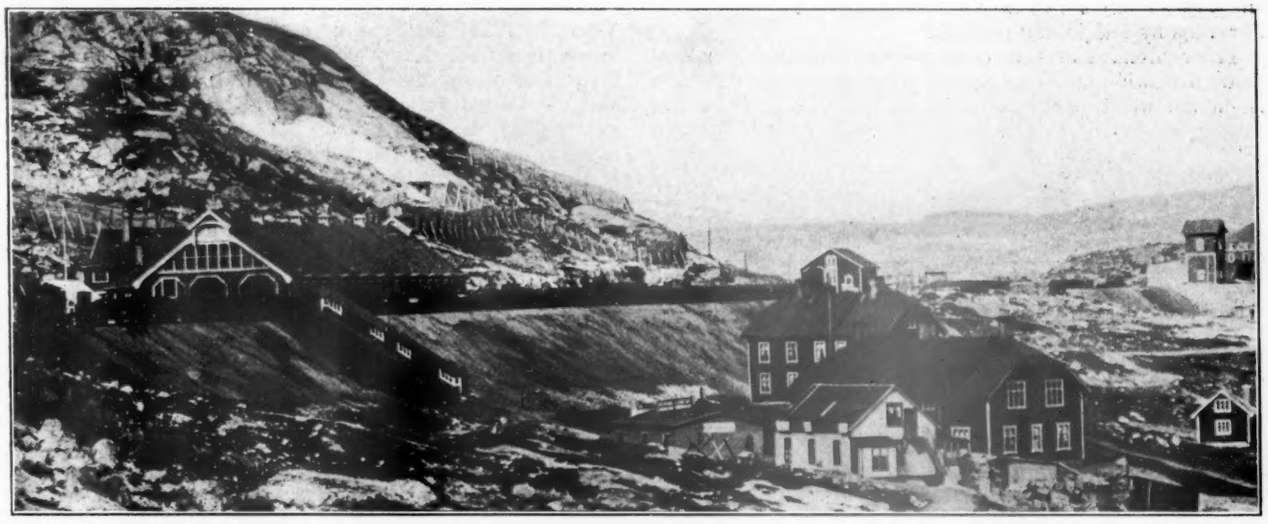
There has been considerable talk concerning a return to private management for the German railways because of the huge deficits that have been experienced and Hugo Stinnes, it is rumored, is seeking control. There is not much likelihood of this being done, however, for it is believed that the new railway finance law now in preparation, which will separate the railway affairs from the general state budget and the influence of parliament, will produce results comparable to those secured under private-ownership.



A Typical Third-Class Coach in Italy

Photo by Keystone

Vienna from the Air



The Most Northerly Railway Station in the World, in Norway—Photo by Key stone.

Railway Situation in Other European Countries

Comments on the Problems and Present Conditions of the Railways in Norway, Sweden, Spain and Belgium

By Robert E. Thayer

THE RAILWAYS of the smaller European nations, whether they be state-owned or not and even though they were not involved in the war, have been severely hit by the war. The following brief notes will give an idea of the situation in Scandinavia, Belgium and Spain.

Norway and Sweden

The principal railways of Norway and Sweden are of 4 ft. 8½ in. gage. In Norway practically all of the standard gage lines and 80 per cent of all lines (1,850 miles) are operated by the state, whereas in Sweden the state operates 3,425 miles of line which is about one-half of the standard gage mileage and 38 per cent of the total mileage of the country. In both of these countries railway expenses have increased to an abnormal degree even though they were not direct participants in the war. The following figures give the net results (surpluses or deficits) of gross revenues and expenses for a period of eight years from 1914 to 1921, inclusive.

In Sweden the freight rates are now from 100 per cent to 250 per cent (according to the nature of the commodity) higher than the 1913 rates and are some 50 to 100 per cent (of the pre-war rates) lower than the rates in effect during 1920. It is believed that the present rates, with the general decrease in the cost of materials and labor, will be adequate to meet the expenses for the coming year. The passenger rates have been increased (above the 1913 rates) some 238 to 330 per cent, according to the distance traveled, for first-class passengers; 181 to 260 per cent for second-class passengers, and 141 to 207 per cent for third-class passengers. These are the maximum rates since 1913 but a reduction is expected early in 1922.

THE RAILWAYS of Europe, whether or not they are in the countries which participated in the recent war, have not been immune from the serious effects of the war. Deficits are the rule, with increased wages and shortened working hours as the principal causes. Nowhere has the economic balance been struck—the high transportation charges required to meet the greatly increased wage bill and material costs threaten to stifle industrial development.

In Norway the freight rates have been increased twice since 1913 and are now 200 per cent higher for all merchandise, with the exception of certain foodstuffs, fodder, manure and fuel, for which the increase is 160 per cent. An attempt has been made by the shippers to obtain a decrease because of the depressed business conditions but the government would not permit it as the railways are still operating with a deficit. The passenger rates are 180 to 190 per cent (first-class) and 140 to 150 per cent (second- and third-class) above the 1913 rates and are at a maximum except for the second-class rates, which have been as much as 180 to 190 per cent above the 1913 rates.

The wages in Sweden are about 200 per cent higher than in 1913, the maximum increase since that time having averaged about 290 per cent. The present wages are subject to a reduction with the cost of living. The eight-hour day is in effect which, with the increase in wages, has been largely responsible for the great increase in operating expenses. A

NET FINANCIAL RESULTS OF GROSS EARNINGS FOR THE RAILWAYS OF NORWAY AND SWEDEN

Year	Norway	Sweden
1914	$8,180,000	$6,290,000
1915	10,780,000	7,380,000
1916	12,100,000	6,610,000
1917	5,630,000	2,155,000
1918	—25,710,000	—14,770,000
1919	—14,570,000	1,370,000
1920	—14,080,000	7,930,000
1921	.....	1,500,000

similar condition exists in Norway, where wages have advanced by 200 to 250 per cent.

The equipment of both countries has increased as shown in the following table; as regards maintenance the condition is on the whole about the same as in 1913. Sweden has purchased some of its new equipment from foreign countries.

EQUIPMENT SITUATION ON THE STATE RAILWAYS OF NORWAY AND SWEDEN

	Norway			Sweden		
Year	1913	1921	Per cent increase	1913	1921	Per cent increase
Locomotives (steam).	385	530	38	890	1,083	22
Passenger cars.....	855	1,041	22	1,697	2,003	18
Freight cars.....	8,714	11,685	34	22,943	27,556	12

In view of the general shortness of money and also because of the poor business conditions throughout the world there are no heavy railway capital expenditures to be made in either of these two countries.

Spanish Railways

That the Spanish railways are in a precarious condition is evident to anyone who has traveled in that country. Passenger trains are consistently late and because of the depressed finances of the country and the great amount of work to be done the companies themselves find it financially impossible to undertake the necessary work. There is a movement in government circles to nationalize the railways but the government finances will not permit of even this being done at present. The rates are not high enough to meet the increase in expenses and it has been proposed to increase them by an additional 35 per cent—the one and only increase of 15 per cent was made on January 1, 1919—making a total of 50 per cent above pre-war rates. The Spanish senate has approved this increase but the government has not seen fit to put it into effect because of the critical condition of the nation's business.

There are four principal lines in Spain: the Northern; the Madrid, Zaragoza & Alicante; the Madrid, Caceres & Portugal, and the Andalusian, all of which serve individual territories with practically no competition. The total mileage of the railways is 9,430 miles, most of which has a gage of 5 ft. 5¾ in. The lines are operated under concessions similar to the French railways and these will expire within some 25 years.

The latest figures available (1920) show an operating ratio of 77.5 per cent but this must be discounted by the poor physical condition of the track and equipment. While there were some 200 more locomotives in the year 1920, as compared with the year 1913 (2,100 in 1913 and 2,300 in 1920), the condition of these locomotives was such as to render the number of available locomotives much less than in 1913. In January, 1921, the Spanish government ordered over 100 locomotives from Germany at prices some 40 per cent lower than those of any other foreign country, including England and the United States. Spain imports most of its railway material and the United States has always had a large share of the car wheel and axle business, but with the depreciation of European currencies the real prices of European products are much lower than those from the United States.

The labor situation is by no means settled. Wages have increased to a large degree but even with the high rates strikes are not uncommon.

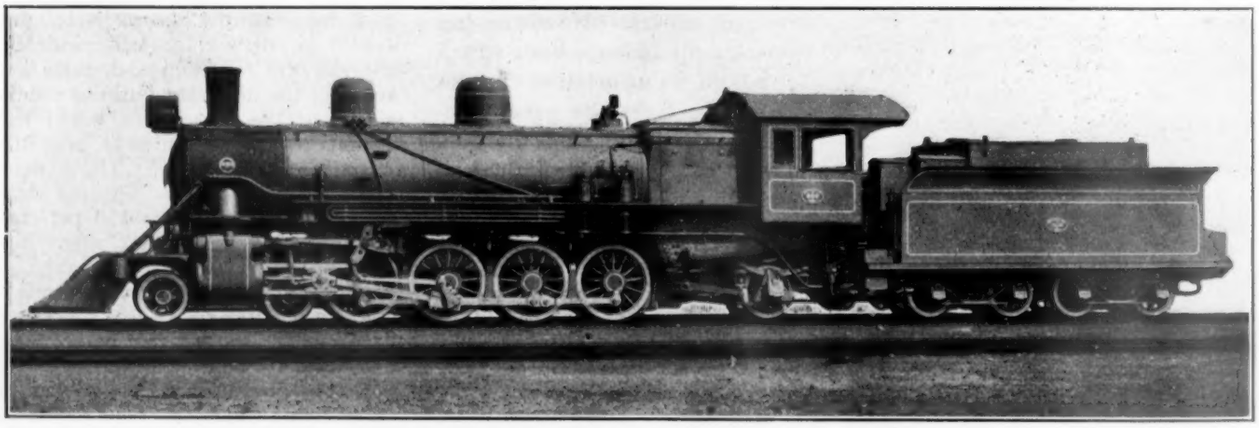
Belgium

The railways of Belgium have been occupied, chiefly, since the war, in the rehabilitation of their lines, equipment and structures. The manner in which they have entered upon this great task has already been discussed in these columns and while it cannot be said that they are back to pre-war conditions they have made very marked progress. Belgium has taken advantage of the great amount of reconstruction work that was required to rebuild their lines with a view to greater transportation efficiency and to ultimate electrification. The signaling system has been entirely renovated and a new system, which is a combination of American and English practice, has been installed under the direction of the late L. P. A. Weissenbruch.

Complete plans for electrification have been evolved and are ready for execution as soon as the financial conditions of the state permit (all of the main line railways are state-owned and operated). For this electrification the direct-current system at 1,500 volts with the third-rail has been adopted with three-phase power at 45,000 or 50,000 volts at power stations.

Belgium has found it necessary to go outside of the country for locomotives, orders for which have been placed in the United States and England. In addition there is a very marked determination to improve the operating efficiency of the locomotives. Extended tests are now in progress with feedwater heaters and exhaust injectors particularly. Much has been accomplished in improved fuel economy (Belgium imports most of its locomotive coal) by an excellent system of locomotive operation supervision with premiums or bonuses for the best performances.

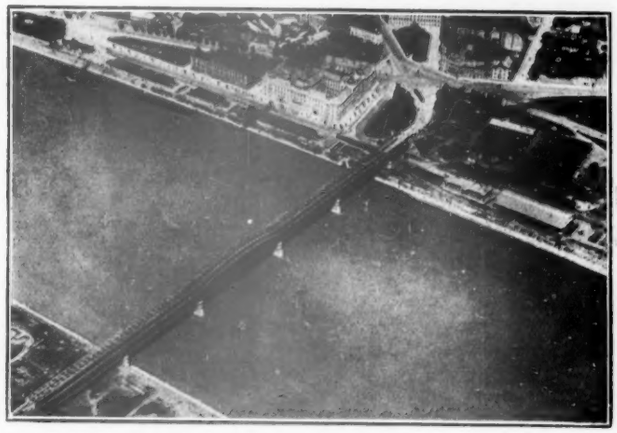
Naturally the financial situation is and has been very bad and due to the fact that a large amount of reconstruction work has had to be done it is not possible to give accurately a proper idea of the finances. Suffice it to say, there have been heavy deficits.



Built by the Baldwin Locomotive Works for the Argentine State Railways

Railway Chaos Central Europe's Greatest Problem

Petty Jealousies and Endless Custom-House Formalities an Effectual Barrier to Prosperity



Bratislava (Pressburg), the Czechoslovak Port on the Danube—Photo from Underwood & Underwood

CENTRAL EUROPE, by which is meant primarily those countries which were carved out of the old Austro-Hungarian empire, has a greater distance to travel toward restoring pre-war efficiency on its railways than any other part of the continent, with the exception of Russia. The extent of the disorganization of the railroads in that part of Europe was described in considerable detail in two articles by Colonel W. B. Causey, American Technical Adviser to Austria, which appeared in the *Railway Age* of October 15 and November 12. In view of the thoroughness with which the situation has been treated by Colonel Causey and the fact that there have been few developments of any special significance since that date, the present article will be restricted to a brief summary of the principal points brought out by Colonel Causey.

The economic standstill of Central Europe, with that of Russia, is admittedly one of the principal factors delaying the return of normal business conditions in the rest of the world. Furthermore, the breakdown of the railways in Central Europe is the primary cause of the productive inefficiency of these countries. The first step toward reviving prosperity in Central Europe must be the restoration of the effective functioning of the rail carriers.

The inability of the railways to perform their work properly, while partly due to the undermaintenance of the physical property, such as roadway and equipment, is chargeable principally to unwarranted political restrictions. Before the war traffic moved with freedom through the whole Austro-Hungarian empire and, with only few hindrances, over international boundaries. With the breaking up of the old empire into a number of independent states all this freedom has gone.

PROSPERITY throughout the world lingers, to some extent at least, because of Central Europe's economic breakdown. Renewed productive activity in Central Europe awaits a return by the railways to pre-war efficiency. These railways must be freed from the artificial barriers to the free movement of traffic which the new Central European states have set up. The problem is to secure co-operation between the various states and bring about physical rehabilitation of the roads.

The nations are for the most part intensely jealous of each other and are chary of permitting the movement of traffic over their borders. The principal railway line between Vienna and Budapest passes through what is now Czecho-Slovakia. This line formerly handled an extremely heavy business. When the empire was dissolved this was changed. The Czecho-Slovacks would not permit the movement of Austrian and Hungarian trains through their territory. Consequently this main line fell into disuse except for local trains in Czecho-Slovakia and traffic between the two great cities, Vienna and Budapest, was restricted to a roundabout single-track line which led through the mountains.

Vienna is a great railroad center. Through it all main routes from the west to the east and south of Europe pass. After the war some of the secession states found all their railroads centering in Vienna, a foreign city which could be reached only by undergoing troublesome customs formalities.

Let us think an analogous situation in terms of our own country. Suppose that each of our states was an independent nation, intensely jealous of all the rest. Let us imagine, if we can, how traffic on the Lackawanna would be affected if there were customs boundaries between New York and New Jersey, New Jersey and Pennsylvania and Pennsylvania and New York, and if none of the states desired to admit traffic from another. The situation would be further aggravated if the Lackawanna were the only through line to the west. Yet exactly such a situation prevails in some parts of Central Europe. Under such conditions in this country Kansas could get few of the products of Chicago's factories and Chicago would suffer for lack of Kansas wheat. Production would be at a standstill as far as all practical purposes are concerned. A part of the nation would starve and the other would freeze. Disaster would be general. The world at large would suffer from the lack of those goods which it is accustomed to purchase from us and we would suffer from the lack of the commodities which the rest of the world could not afford to send to us without payment in kind. Thus economic conditions not only in this country, but in the entire world, would be affected.

Similarly the whole world is waiting for a revival of business; for Central Europe this means first of all a return of railway efficiency. The return of efficiency means that co-operation must replace the petty jealousies on the part of the new nations.

Central Europe is bound by universal economic laws. If transportation and the free interchange of goods is needlessly hindered, then business and prosperity must languish—particularly where the transportation tie-up takes place, but also in the rest of the world insofar as its productive activity depends upon exchanging commodities with the country effected.

Flood Protection for the Peking-Kalgan, China—Photo Used by Courtesy American Locomotive Company

Chinese Railways Experience Normal Year In 1921

New Construction Greatest Since 1916—Railways in General Earning Substantial Returns

By Railway Age's Correspondent in China

PEKING, China.

RAILWAYS IN CHINA are classified under three categories: government, private, and "concessioned." Of the last named there are 2,294 miles, consisting of the Chinese Eastern, the South Manchurian, the Shantung, the Yunnan, and the British portion of the Canton-Kowloon lines. Private lines aggregate 477 miles and, except for two or three provincial efforts, are mostly mining auxiliaries. The government lines comprise about 4,030 miles.

None of the "concessioned" or private lines publishes statistics to an extent sufficient to yield an intelligent impression of their operations. It is known, however, that the chaos on the Chinese Eastern has been considerably reduced, and that under the guidance of John Stevens improved operating methods are gradually being introduced. The South Manchurian has felt the general slump in business sufficient to induce sweeping reductions in forces, and common report has it that a large American loan is being sought. The Shantung Railway is believed to be prosperous, but it is a fact that the strawbraid industry has been dead, the hair net industry has shifted its capital from Tsing Tau to Cheefoo, and that there has been little doing in the peanut trade. The line is being boycotted as much as possible by the Chinese and it is difficult to see how a line can be prosperous when the principal industries in the territory served are stagnant and the natural patrons are hostile. Mining developments under Japanese direction, however, may be sufficient to overcome the handicap.

CHINA with a population of 300,000,000 has but 6,800 miles of railways. Manifestly this country offers a fertile field—offset somewhat by political conditions, it is true—for railway expansion. Steps have been taken toward standardization during the past year—in specifications for equipment, in rates and in accounting.

Keen competition by various foreign manufacturers for the equipment and supply business. Track and bridge materials should constitute major purchases in immediate future.

The only effect of the war on Chinese railways was to bring about a shortage of rolling stock, a reduction in interest charges, and higher costs of operating supplies. The road-bed suffered no change. During the years of 1920 and 1921 the shortage of rolling stock has been quite adequately corrected. The favorable rates of exchange by which Chinese railways paid interest charges and loan instalments to foreign creditors swung back to about normal in 1921, and will mean an increase in annual requirements of about six or seven millions of dollars, Chinese currency, compared with 1919. Materials in stock during the war were charged out of expenses at pre-war prices largely, although they had to be replaced at war prices. This left apparently large net revenue funds, when as a matter of fact the managements were not particularly flush with money. Now that the stores are stocked with the higher-priced materials, their gradual consumption will swell operating expenses and create an impression of hard times on the lines, when the lines will actually have larger free supplies of cash than they have had in recent years.

It is difficult to predict any "free supplies of cash," however, for the treasury of the Ministry of Communications has been "raided" several times during the past year. The first to get public recognition were the school teachers, who went

out on strike because of non-payment of salaries. The Ministry of Communications put the teachers back in the schools. The military chieftains, also, have undoubtedly had their share. During the latter half of the year Wu Pei-fu, in command of the armies about Hankow, placed his representatives in the stations on the southern half of the Peking-Hankow line, and these have remitted the station receipts direct to his headquarters. Care has been taken to keep clear accounts and to give receipts, so that these earnings will enter the statistics of the line and proper credit can be claimed by the line from the Ministry of Communications and by it from the Ministry of Finance, which in turn will debit the Ministry of War. Thus does China progress in cutting "red tape" to a minimum.

Courtesy American Locomotive Company

The Peking-Kalgan, China, Traverses a Rugged Country

1921 a Normal Year

The year 1921 may be summarized as being typical of general conditions during a series of years. There have been the inevitable military manoeuvres, the usual pests and calamities, and the usual changes in administrative chiefs of the highest grades. There have been also the usual extensions of service, the usual advancement in the standardization program, and the usual increase in revenues. There has been an unusual amount of new construction.

The year began with north China in the grip of the worst famine in 45 years. In the spring came an area of pneumonic plague, in the summer Wu Pei-fu's military movements around Hankow, and in the fall the floods along the southern end of the Tientsin-Pukow. The official figures for 1920 have not been published yet, due, it is said, to the "unscrambling" of the Peking-Hankow and Peking-Suiyuan lines, causing a delay in closing the accounts of those lines, but it is pretty well known that the operating revenues for 1920 were about $90,000,000. If remaining months keep up the record of these earlier months, 1921 will overtop 1920 by fully five million. From the standpoint of railway revenue, the famine was not as disastrous as expected. Due in considerable part to funds contributed from America, no great loss of life occurred. Although famine grain was carried free and other grain at 75 per cent of normal rates, the increased tonnage of grain and the longer average haul actually increased railway revenue from grain.

Increasing New Construction

The year 1921 saw more construction work underway in China than any year since 1916, when the war interrupted all foreign activities. The most important single piece was the completion of the section from Fengchen to Suiyuan, on the Mongolian border, and the immediate beginning of a further extension to Paotow, on the northern bend of the Yellow river. A beginning has been made also on a branch line of 80 miles extending from Chinchow on the Peking-Mukden to Chaoyang, a coal mining region.

The Japanese have under active construction the extension of the Ssupinkai-Chenchiatun to Taonan. With famine sufferers as laborers paid out of surcharges on the various railway revenues, the Ministry of Communications has constructed the earthwork of a line from Shihchiachuang, the junction of the Cheng-tai and the Peking-Hankow railways, to Tsangchow on the Tientsin-Pukow Railway, together with the earthwork and culverts of a branch to the Shantung Railway, extending from Weihsien to Cheefoo via Lungkow.

Track Laborers on the Peking-Kalgan, China

Deliveries of Equipment

The Lung-Hai has work underway at its western end, and the American Red Cross, as a means of famine relief, has constructed 850 miles of highway, much of which can be

easily converted into roadbed for desirable branch lines or extensions when it is desired to do so. The preliminary work has been undertaken for the double-tracking of the Peking-Mukden line from Tongshan to Chingwantao.

A considerable number of locomotives and cars have been delivered during the year. English firms secured the orders from the Shanghai-Nanking and Belgian makers part of the order on the Peking-Hankow. But all of the remainder, the Peking-Hankow, the Peking-Suiyuan, the Tientsin-Pukow and the Peking-Mukden, received their deliveries from American sources. With the conclusion of a contract with American interests for a large order of locomotives and goods wagons by the Peking-Suiyuan a few weeks ago, it would seem that the Chinese requirements along this line would be nearly met. At least the great shortage which accumulated during the war will be relieved. On the other hand, not much has been done toward an addition or replenishment of passenger cars, except on the Tientsin-Pukow, which has ordered five complete all-steel Pullman trains for the Shanghai-Peking run.

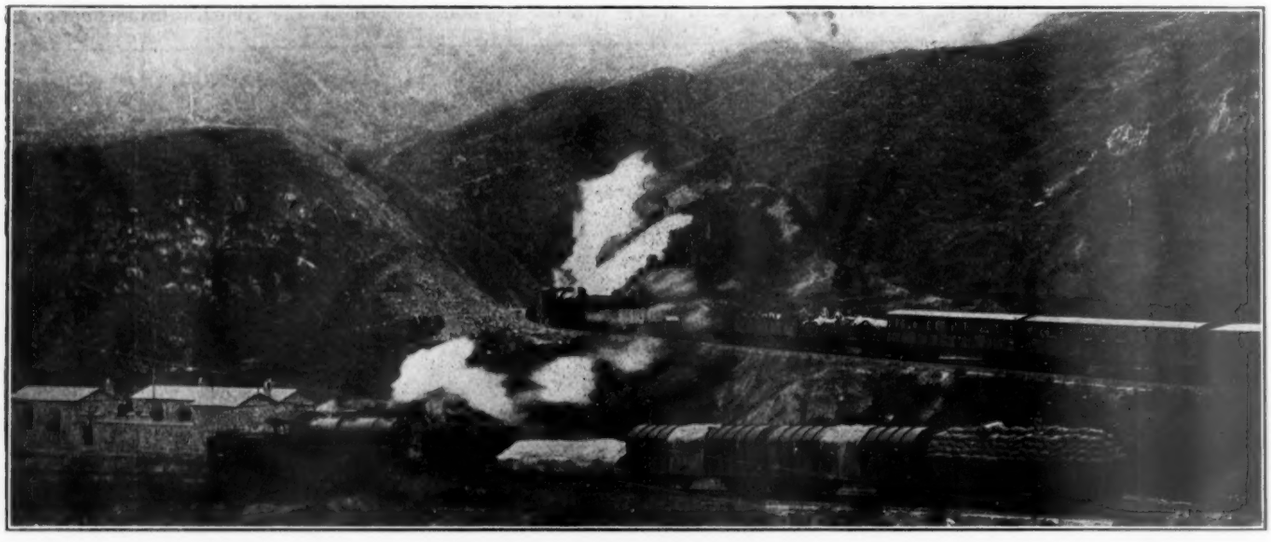
Progress Toward Uniformity

The standardization program of the government railways has continued. A uniform classification of goods, with weights and distances reckoned in the metric system, has been put in force on the contiguous lines, together with through-billing of freight. The clearing house in the Ministry of Communications has charge of the auditing. A uniform system of car reports and standard rules for car distribution has also been put in force. Perhaps the most drastic step yet taken in the improvement of the service, however, was the assumption of risk of damage to goods in transit by the government railways, beginning February 1. Railway risk rates are 10 per cent higher than owner's risk rates, and any of the other pieces of earthwork which could be converted into rail lines. The line just mentioned is the connecting link between the Shansi coal fields and the port of Tientsin. The traffic of the Cheng Tai railway pays a re-

Courtesy American Locomotive Company

High Standards of Track Maintenance on the Peking-Kalgan, China

turn of nearly 9 per cent on that line, and the bulk of this traffic would be immediately turned over to the new line. It would seem, therefore, that the producers would be justified in offering very liberal terms of security to the management in return for a contract to equip the line. If negotiations



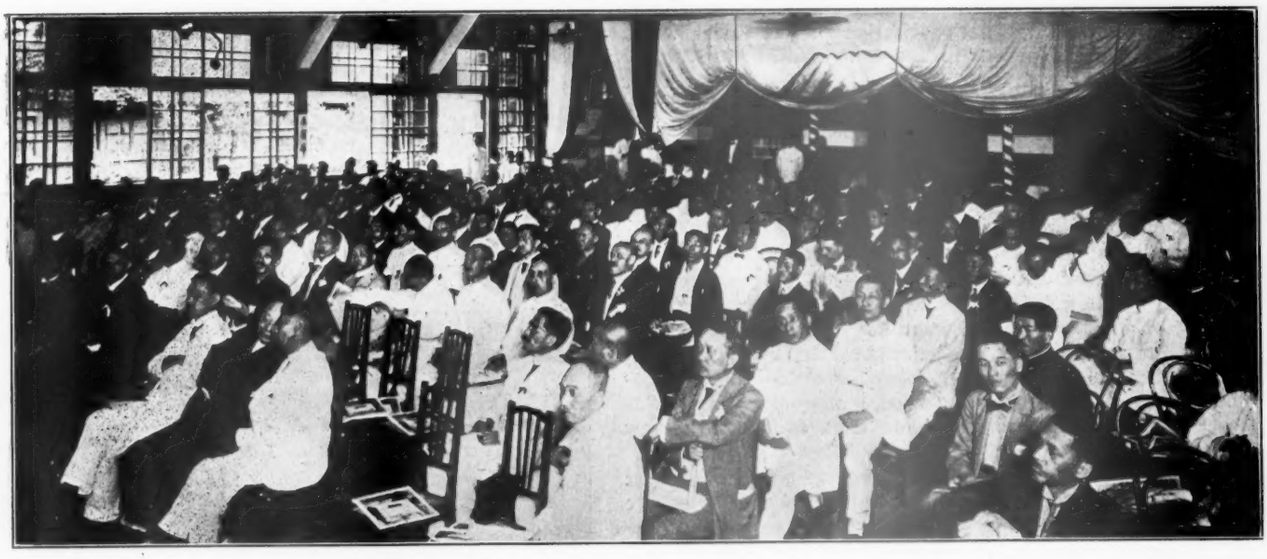
A Junction on the Peking-Kalgan, China

the shipper has his option as to which plan he wishes to use. Uniform stores accounts also went into effect during the year and uniform rules to govern public tenders for materials were promulgated a few weeks ago.

Opportunities for Exporters of Track Material

Perhaps the most promising field for American manufactures in connection with Chinese railways is to be found for track and bridge material. Undoubtedly the requirements of the Peking-Mukden line are covered already, but at this writing nothing has been done towards the rail and bridges of the Shihchiachuang-Tsangchow line of 120 miles, nor were successful on the first line, the others would be worth looking into.

The "spiciest" event of the year was the opening of tenders for the Yellow river bridge. A jury of five had been selected to make the award and it soon developed into a quarrel between the French, English and Belgian members on the one hand, and the American member, supported by the Japanese member, on the other. After a series of charges and countercharges from these members, the Chinese management concluded to hold up the award which had been made to a Belgian firm. The latest rumor is that new tenders will be called for, to be opened by a new jury.



A Recent Session of the Japanese Imperial Railway Association

Some Observations on the Japanese Railroads

2000 Miles of Private Lines Operated in Close Harmony with 6000 Miles of Nationalized Lines

By B. B. Milner

THE NATIONALIZATION of the railway lines in Japan effected in 1906-7 did not represent so much a change in the plan of administration in the nation's railways as it did an expansion of a nucleus already state-owned by incorporating therewith a large number of important privately-owned and operated lines. At that time, to the state-owned nucleus of 1,500 mi. were added 3,000 mi. of previously privately-owned and operated lines. To this combination of 4,500 mi., there have been subsequently added some 1,500 mi. of lines, built or purchased, so that the present nationalized mileage approximates 6,000 mi. This, with 2,000 mi. remaining in the hands of private owners and operators, constitutes the connected lines of the Island Empire.

A Japanese government loan built the first railroad lines in Japan and, as in the case of many other large enterprises, the state has always played a large role in the development of transportation. The co-operation of private capital and enterprise was encouraged from time to time, essentially because no other means could be commanded for providing promptly the mileage for which urgent demands had rapidly developed. The right of state purchase has been always reserved in case of any grant of permission for private construction.

The first lines, Tokyo to Yokohama and Osaka to Kobe, 18 and 20 mi. respectively, were completed in 1870 by a British engineering corps to 3 ft. 6 in. gage, which was made, and has remained, standard upon the islands. The widening of this gage to 4 ft. 8½ in. has been advocated from time to time but the probability of this being undertaken within any reasonable period, if indeed at all, is very remote. The matter, it seems, was espoused by one of the political parties but has recently suffered defeat in the Diet. It is generally believed that the probable cost was greatly underestimated for those who advocated the change and that greater returns may be obtained for the Japanese shippers and travelers in the cost and character of service, by the expenditure of smaller sums and effort in other channels, particularly those bearing directly upon increases in the capacity of existing lines of the present gage. For the 700-mi. dense traffic line between Tokyo and Shimonoseki, one estimate of the cost of the gage change, $110,000,000, was certainly a very low figure.

NATIONALIZATION represents a prearranged development logically following state encouragement afforded the construction and operation of private lines.

Unified operation incident to nationalization carried with it standardization in all phases of operation, service, equipment and maintenance practice. The introduction of employees' welfare, instruction, insurance and relief benefit work began promptly.

Natural and economic conditions, cheap hydro-electric current, expensive and limited coal supply stimulates the replacement of steam by electric operation.

From State Aid to Nationalization

State encouragement—in some cases financial aid—stimulated private line construction and gave to Japan from this source more than 1,000 mi. of line within one ten-year period. Mileage having been provided, the question next demanding attention was how these private lines, mostly short, disconnected and scattered about the country might be extended and organized into a single through-line system

insuring uniformly efficient service. This question was answered by the large nationalization project under which the purchase of 17 private lines was accomplished in 1906-7 by the issue of five per cent domestic loan bonds. In the case of nine properties, the price of purchase was determined upon the basis of previous operating profits. With the eight properties remaining the price was amicably arranged between the contracting parties so that in not one case was it necessary to make use of the arbitration committee provided for in the law authorizing the purchases.

The work of 1906-7, and consequent removal of many and various difficulties incident to the previous independent management of the many lines, indeed marked an epoch in the history of Japanese railroad operation. The Imperial Government Railway accounts are maintained separate and apart from other branches of governmental activities and all disbursements, construction, operation, and improvement costs are met from the profits accruing from traffic and a few closely related activities.

From the standpoint of utility, the results of government ownership and operation have been satisfactory. The service has been greatly improved, lines have been extended to remote quarters wherein private lines could not hope to succeed, passenger and freight rates have been lowered in spite of the general advances in the cost of labor and materials. The capitalization of the lines was in 1918, $594,956,867, and the profits from operation amounted to 5.8 per cent over a term of years including the years ending in 1914, 15, 16, 17 and 18, within which years the profits amounted to 6.1, 5.5, 6.2, 7.2 and 8.3 per cent respectively. During the ten-year period following 1906-7, earnings per train mile increased $0.13 while corresponding expenses fell $0.01½. The proportion of freight traffic has increased to the point of exceeding passenger traffic since 1915, though by quite small margins.

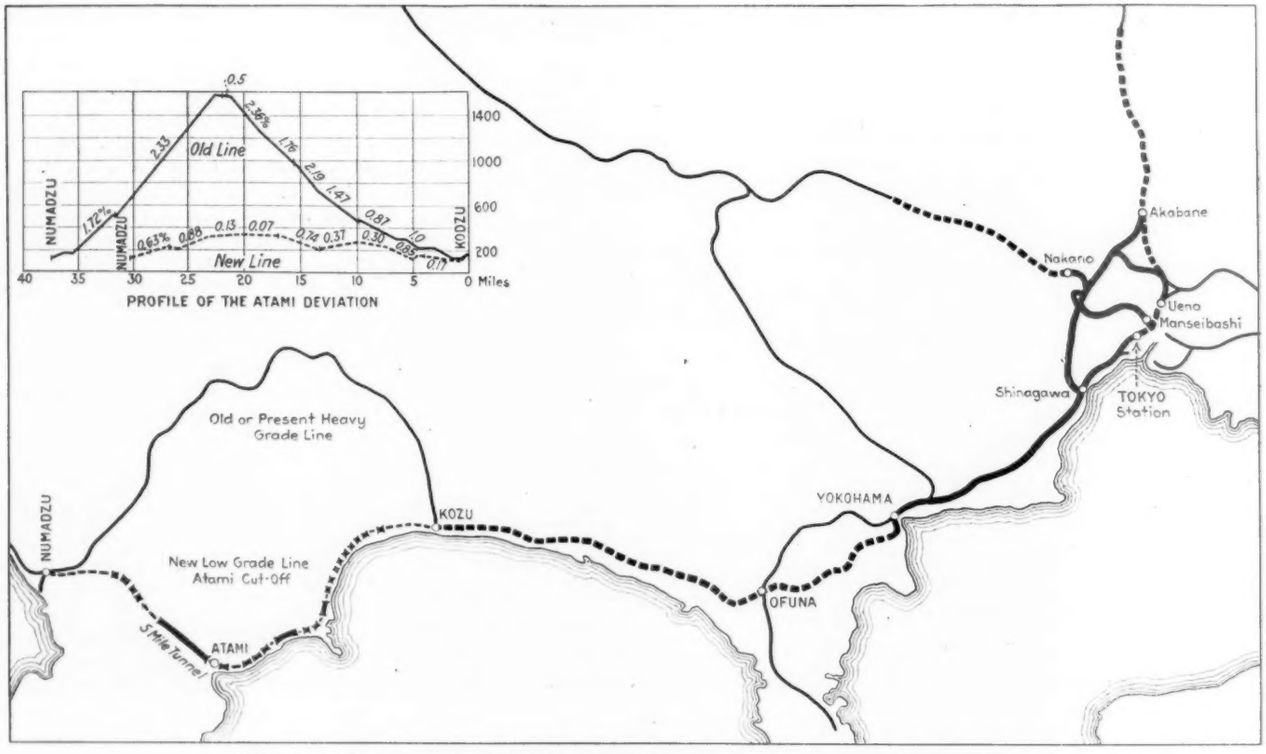
With the consolidations effected, the organization was changed from departmental to divisional and the lines have been divided into six grand divisions having headquarters at Sapporo, Sendai, Tokyo, Nagoya, Kobe and Moji respectively.

Tracks and Construction Work

The excellent condition of tracks, grade, alinement and ballast, is striking, particularly in view of the heavy rainfall and the amount of water to be contended with generally; it is only fair, however, to call attention to the maintenance advantages enjoyed by reason of the relatively low wheel loads and speeds. The latter average, for passenger trains, from 25 to 30 m. p. h. and for freight trains, from 15 to 20 m. p. h. on the more level sections. The excellent character of the large amount of retaining wall and other masonry to be found upon all the lines is very noteworthy.

Typical Railroad Shop Bath House

On the main line, south of Tokyo and Yokohama, very important reconstruction work, known as the Atami low grade short line between Kozu and Numazu, is under way. This includes a five-mile tunnel, work upon which has pene-



Japanese Government Electrified Lines Near Tokyo and Projected Extensions

trated a distance of one mi. from each end. This undertaking was originally estimated to cost $12,000,000, but some $17,500,000 has already been expended and a further like sum will be required for its completion. This increased cost is practically all due to the increased cost of labor and materials and therefore does not affect the ratio value of savings and operating advantages over those of the old line. By the time this new line is ready for use, the replacement of steam with electric operation will have been extended south and west from Tokyo and Yokohama to Numazu (79 mi.) or further.

Development of Electrified Lines

The line between Manseibashi station in Tokyo to Nakano in the suburbs (8 mi.) was electrified in 1905 before

Japanese State Railway System

the Kobu Railway, of which this section formed a part, was taken over by the government in 1906-7 and is now known as the Central Line. Then came the electrification of the Yamate Line from Shinagawa around through the suburbs of Tokyo to Ueno station and Akabane which was completed in 1910. The crossing of Usui pass west of Tokyo presented great engineering difficulties and on what continues to be the best location possible there is a vertical lift of 1,817 ft. in the 6.9 mi. from Yokogawa to Karuizawa and a total of 26 tunnels of length aggregating 2.8 mi. The obvious discomforts and difficulties incident to steam operation were eliminated in 1912 by the use of electric locomotives. On 5.2 mi. of this line the grade amounts to 1 in 15 or 6.7 per cent. Rack rails continue to be used and such an operation as part of a through line railroad remains unparalleled in the world.

The operation of a new double track electric suburban passenger service line between Tokyo and Yokohama (18 mi.) followed in 1915. This line, except for a short section between Tokyo station and Shinagawa, is operated at 1,200 volts instead of 600 volts, in view of contemplated extension of electric service over the present steam lines to Yokosuka, and the extension of suburban electric service from Sakaragicho (present terminus of suburban service within the city of Yokohama) to Ofuna, thence to Kozu and ultimately to Numazu and beyond over the Atami low grade cut-off.

The power sources provided for all of these electric operations were steam plants but more recently much attention has been given to possibilities of hydro-electric development in Japan generally, which is naturally suggested by the available water power and the economic necessity of conserving Japan's limited coal supply for such industrial purposes as cannot be served by electricity. In the *Railway Age* of December 10, reference was made to large orders for hydro-electric apparatus recently placed in this country. The Government Railways have now on order with three builders six electric locomotives for experimental use in lieu of steam locomotives on the lower grade lines about Tokyo as an initial step in an electrification program which spreads over three five-year periods and contemplates the replacement of steam on some 500 mi. of the more dense traffic sections of the lines around and south of Tokyo.

Standardization of Equipment

The extension of government ownership and operation brought with it standardization in many particulars and

Imperial Railway Association Club House at Tokyo

extensive investigations of various subjects and phases of railroad operation along broad lines, many of which have become the foundation of definite policy. The standardization of passenger car equipment was accomplished by the end of 1910. In the meantime little equipment was built save that possible with the materials on hand and taken over with the old private lines by the government. The lengths of the new standard cars became 55½ feet for four-wheel truck cars and 66 feet for six-wheel truck cars, against the prevailing 26 feet for the ordinary four-wheel cars replaced. The passenger car equipment of Japan is now electrically

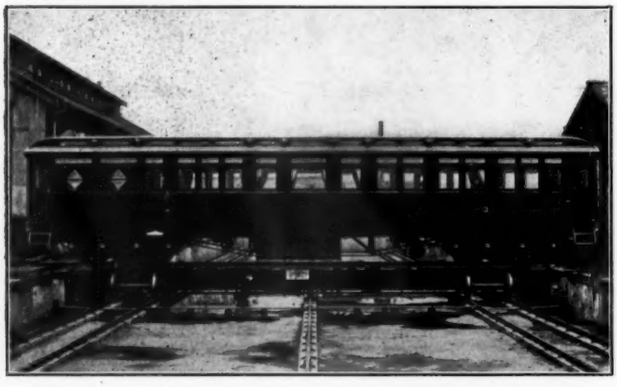
lighted (axle generator system), steam heated (pressure system) and equipped with vacuum or air brakes and English hook couplers. The latter are scheduled for replacement with automatic couplers as used in America in accordance with a carefully arranged program which will be pursued more or less rapidly as funds become available.

Corresponding organized standardization work was undertaken with regard to freight car equipment. The capacity of the larger cars at the time was seven tons and 1911-12 saw the completion of designs for standard nine-ton cars and standardization of two-axle designs for seven and ten-ton capacities respectively, which replaced more than 100 designs then on hand and in use. The link and pin couplers found in the northern island (Hokaido) lines were promptly replaced with American automatic couplers. By 1915 the capacity of standard cars on the main and southern islands became 15 tons, that of the Hokaido lines, handling a large coal business, 25 tons, and within ten years this capacity and 30 tons will doubtless be standard upon all the lines.

Economic factors and the preservation of a proper ratio between the weight of carload shipments offered by Japanese shippers and the capacity of cars supplied therefor, renders inexpedient too rapid introduction of high capacity cars such as currently used in America. The progressive disposition of the Japanese will push these capacities ahead just as promptly as operating conditions will warrant. Complete replacement of the hook coupler is programmed along with the introduction of the compressed air brake, there having been already shipped from America some 200 locomotive sets, 250 passenger car sets and 350 freight car sets.

Four types of locomotives were promptly standardized; a heavy grade 0-10-0 type, a Consolidation, an American (4-4-0) and a Mogul. A Pacific type passenger locomotive has subsequently been developed. All locomotive equipment has for some eight or nine years, been manufactured at plants developed at Osaka and Kobe.

A complete reorganization of repair shops was planned and undertaken. Ten leading plants were closed, eight developed and some 25 are now operated, 15 of which handle both car and locomotive work, one exclusively locomotive work, and nine exclusively car work. As in the case of



Exterior of Formosa Government Railway Private Car

locomotives all new car equipment is now being built in the Empire, the higher class passenger cars, viz., diners, sleepers and first-class coaches, in the government railroad shops at Omiya and Oi, the third-class coaches generally and a part of the new freight car equipment, as well as a part of the new second-class coaches, at an outside car building plant located at Nagoya.

Imperial Railway Association

The Imperial Railway Association, constituted of railroad officers from all over the Empire, is a thriving institution which holds annual meetings at varying points much as does the American Railway Association and its branches. The association occupies the unique position, however, of having provided itself with a well appointed club house at Tokyo, which constitutes a most convenient and comfortable rendezvous for members living in and visiting the capital.

Research Bureau

The testing and research work of the lines was organized in a railway research bureau well equipped with physical and chemical laboratory facilities, a locomotive testing plant and a most complete dynamometer car which was purchased in the States. The reports of the bureau's work are issued in printed form from time to time in a manner suggesting the

Tracks and Signals Near Yokohama

practice of those lines in the United States which have spent the most time and funds on the matter of tests and reports.

Railway Institute

The Railway Institute, which was organized in 1909, for training railway men, is especially noteworthy. At the Central Institute, located in Tokyo, about 200 students are quartered, much as in a boarding school, for two years of training in either a railway business, mechanical or an electrical course. The students are selected from the ranks of young employees in accordance with aptitude and fitness developed in their service, and their regular compensation is continued during the term of their schooling. A special language course covering English and the elements of Russian is provided for those who elect it. The 1,000 students who have been graduated since the opening of the Institute in 1909 are scattered in railroad service all over the Empire. Of these about 150 have availed themselves of a training in the language course referred to. There have been also established upon each grand division, district institutes providing less complete business and technical courses, also special training courses for conductors, stationmen, enginemen, firemen, car inspectors, telegraph operators, etc.

Welfare Work

Employee's welfare work has been given a prominent place in the activities of the administration. Four hospitals have been established besides some 15 dressing rooms and dispensaries at shops and some 20 at other points. Treatment includes internal as well as injury and other surgical cases. All expenses are paid from the railroad treasury. A large corps of railroad physicians covering the entire lines has been organized and these attend to the physical examinations now required for employment and the medical treatment of employees, their families and passengers in the sections individually assigned them. An insurance institution designed to furnish sickness and death benefit relief to members and families affords such relief under three classifications to about 125,000 employees. The subscriptions from members have been amounting to about three-fifths of the cost.

The Circuitous Darjeeling Himalayan Railway, India

The Indian Railways Face a Serious Problem

New Equipment and Plant Needed—Country Hampered by the Lack of Facilities

By Robert E. Thayer

THE PRESENT PROBLEM of the Indian railways is physical rather than financial. For the past 45 years the net earnings of the capital invested in the railways has never been below four per cent and for the past 20 years it has been below five per cent only three times. Notwithstanding this favorable showing, the railways have been allowed to deteriorate so that at present there are scores of bridges which are unfit to carry the modern train loads and there are many miles of rails, hundreds of engines and thousands of freight cars in service that should have been replaced some time ago.

Government Starves Railroads

It has been the policy of the government in the past to appropriate the bulk of the railway's earnings for general governmental expenses with the result that the development of the railways has been sadly neglected.

For the fiscal year ending March 31, 1920, the revenue receipts from the railways was $266,500,000 as against $585,000,000 of other receipts, or nearly half as large as all the other receipts in the budget put together. The money that should have been available for improved railway facilities was appropriated to relieve the taxpayer. In 1907 the Mackey Committee, which was investigating Indian railway conditions, recommended a yearly capital expenditure of some $60,000,000 as necessary for keeping the railways up to the proper standard of development and improvement. It is interesting to note that for the eight fiscal years (1908-1916) an average of only about $50,000,000 was spent and for the three following years only $17,500,000. During the last three years—1919-1922—the capital appropriations have averaged about $72,000,000. The time has come when it is impossible to restrict further capital expenditures for improvements, for maintenance and renewals are sadly in arrears.

INDIAN railways are financially prosperous, but under control of the state and having their finances mixed in with the general budget, the surplus earnings are taken for general state expenses, thus reducing taxation.

Their physical condition is such that they cannot properly take care of the present traffic requirements, to say nothing of the anticipated requirements.

Heavy expenditures must be made to improve the railway plant.

Not only has the lack of sufficient capital appropriations hampered the development of the Indian railways but the fact that these appropriations are only good for one year with no assurances of renewal has made it impossible, in many cases, to use the sums appropriated to the best possible advantages.

General Business Suffers

This lack of proper maintenance and development has had a serious effect on Indian business. Large new coal areas remain undeveloped and new industries are being held up because of the lack of railway facilities. There has been a serious shortage of freight cars, and passenger travel, particularly the third-class, has been crowded. Frequent embargoes have resulted from insufficient track capacity at classification junctions. Shippers have been forced to use road transport both by truck and camel trains. In one case the European oil seed market was lost owing to lack of railway transport. The situation has become so bad that the Associated Chambers of Commerce of India and Ceylon has gone on record for drastic revision in the present railway policy.

The opportunities of development in India are well indicated by the fact that with an area of 1,800,000 square miles —almost as large as the United States—and a population of 300,000,000—three times as large as the United States—there are only 36,735 route miles of railways. Coupled with this is the very apparent prospects in the improvement of trade. Of the 36,735 miles of railroad about 49 per cent is of 5 ft. 6 in. gage and 41 per cent 3 ft. 3⅜ in.; the rest is 2 ft. 6 in. and 2 ft. gage.

The Indian railways may be divided into five general classes:

(1) State lines worked by the state.
(2) State lines worked by guaranteed or independent companies.
(3) Company lines worked by companies.
(4) Lines belonging to Indian states.
(5) Miscellaneous.

The first two classes comprise about two-thirds of the entire mileage in India.

TABLE I.

Route Mileage of Principal Indian Railways (March 31, 1920)

	5 ft. 6 in. gage	3 ft. 3⅜ in. gage	2 ft. 6 in. gage	2 ft. gage
State lines worked by state	5,863	1,141	333	7,369
State lines worked by companies	9,741	8,306	927	46
Branch line companies under rebate terms and worked by main lines	1,160	122	298	108
Companies lines subsidized by the government of India	206	1,729	234	....
Indian state lines worked by Indian states	....	2,123	171	302
Indian state lines worked by main lines	632	804	386	....
Companies lines guaranteed by Indian states	330	391	39	....

Note—The grand total route mileage of all railways in India is 36,735 miles.

Table I gives an idea of the distribution of the mileage as between the different gages. The broad gage (5 ft. 6 in.) was chosen in 1851 when the railways were first built in India for the greater stability it offered as compared to the 4 ft. 8½ in. gage. The 3 ft. 3⅜ in. gage was adopted for auxiliary lines to the broad gage lines but they have expanded to such an extent that they now serve large areas, as indicated by the mileage figures. Even the real narrow gage lines, which are only feeder lines, have developed rapidly in the past ten years.

At the close of the fiscal year 1919-1920, the open mileage increased to 36,735 from 32,099 of ten years ago; it is now made up as follows:

Gage	Present Mileage	Increase in 10 Years Per Cent
5 ft. 6 in.	17,990	7.71
3 ft. 3⅜ in.	15,181	12.2
2 ft. 6 in.	2,926	10.4
2 ft.	638	47.6

At the close of the year there were 1,822 miles under construction, or sanctioned for construction, of which there was 665 miles of 5 ft. 6 in. gage and 805 miles of 3 ft. 3⅜ in. gage.

Revenue and Expenses

As has already been stated, the Indian railways are in a good financial position. At the end of the financial year in 1920 there was a capital of some $2,000,000,000 invested in the Indian railways and even in that year the return on that capital was 6.8 per cent.

TABLE II

Earnings, Expenses and Mileage of All Indian Railways (Five Years)

	Fiscal Year Ending March 31				
	1916	1917	1918	1919	1920
Open route mileage	35,833	36,286	36,333	36,616	36,735
Total capital (millions)	$1,722	$1,741	$1,765	$1,785	$1,840
Gross earnings (millions)	$210	$230	$251.5	$280.5	$290
Total working expenses (millions)	$107	$108.5	$114.8	$136	$164.8
Operating ratio (per cent)	50.91	47.26	45.72	48.45	56.81
Return on capital (per cent)	5.99	6.96	7.75	8.09	6.80
Train mileage (millions)	159.	163.6	157.	158.6	162.2
Gross earnings per train mile	$1.32	$1.40	$1.60	$1.77	$1.79
Working expenses per train mile	$ .67	$ .66	$ .73	$ .86	$1.02
Net earnings per train mile	$ .65	$ .74	$ .87	$ .91	$ .77
Freight ton-miles (millions)	17,158	19,826	21,015	22,141	20,402
Passenger miles (millions)	16,529	17,846	16,204	18,040	20,615
Av. miles one ton was carried	207.98	230.08	245.87	242.88	232.33
Av. rate per ton-mile (cents)	.735	.68	.691	.721	.75
Av. passenger journey (miles)	35.59	36.82	37.66	39.24	39.64
Av. rate per passenger mile:					
First-class (cents)	2.315	2.255	2.8	2.585	2.715
Second-class (cents)	.931	.858	1.145	1.21	1.351
Intermediate class (cents)	.535	.531	.68	.705	.713
Third-class (cents)	.388	.392	.47	.484	.48
Season or commutation (cts.)	.24	.242	.254	.252	.26
Total (cents)	.412	.419	.505	.516	.519

Table II gives an excellent idea of the financial performance of these roads for the past five years. It will be noted that even through the war the operating ratio was very low and the last year it was only 56.81 per cent. And with it all the rates were exceedingly low. It seems a pity, therefore, that with this excellent showing as an operating unit the railways should be in such a poor physical condition.

Reorganization Planned

Such has been the service rendered by the Indian railways to the public. Because of the large number of complaints received from the shippers the British government through the Secretary of State for India caused a searching inquiry to be made by a special committee, headed by Sir William M. Acworth, into the administration and working of the Indian railways. This committee has recently made its report and while it was unanimous in its decision that the railway budget should be kept separate from the state budget, it was divided in its opinion as to the administrative policy.

Sir William headed the group favoring state management, as opposed to the recommendation of the other group recommending private companies with a board of directors. In commenting on his discussion in the matter Sir William has said that although he has been and is a thorough believer in private management he was forced in this particular instance, by the facts as he found them, to recommend the state management. No definite decision has yet been made, but one thing is sure—something must be done immediately.

New York Central Yards and Elevators at Weehawken, N. J.

Central Railway Station at Sydney, Australia

Unifying the Railway Gages of Australia

Exchange of Traffic Between the Different States of the Commonwealth Now Greatly Hampered

By F. M. Whyte

IN FEBRUARY, 1921, a commission was appointed by the Commonwealth Government of Australia, in agreement with the five continental states of the Commonwealth, to recommend a standard gage of track for the railways on the continent; to give the reasons for such recommendation; to estimate the cost of providing between the capital cities the gage of track recommended and any new lines necessary to accomplish this desire; the estimated cost of converting all lines to the gage recommended; the methods by which the work should be executed and controlled; and whether any third-rail or other mechanical device should be used, if so, what one. In order to give to the commission plenary powers, it was made a Royal Commission. Its personnel was to be an Australian outside of the railway service (John J. Gavan, of Sydney, was appointed as such and was also appointed chairman); a civil engineer from England (Rustat Blake, of London, was appointed); and a mechanical engineer from America (for this assignment the writer was appointed).

THE five continental states of Australia built their railroads independently and without regard to interchange of traffic. Several different track gages were used.

Recommendations of a special commission were accepted early in November last, and work will doubtless be started shortly, looking toward the final standardization to a 4 ft. 8½ in. gage. The more important changes can be made by 1930 if work is started promptly.

The railways of the sixth state, the Island of Tasmania, were not included in the investigation; these have no physical connection with those on the continent.

It will be noted that the questions submitted to the Commission refer in no way to improvement of present tracks, structures, and equipment, nor to taking up deferred maintenance.

It is desirable, before considering the report of the commission to present some data and general information about Australia because a great many persons in America have rather hazy ideas of that distant country and there seems to be a general desire to know more about it.

The area of the continent of Australia, disregarding Tasmania, is greater, by an area of that of New Hampshire and New Jersey combined, than the land area of the continental United States. This area of Australia had in 1921 a population, aside from aboriginals, of, roundly, 5,200,000, and about 44½ per cent of these were in the capital cities of Sydney, Melbourne, Adelaide, Brisbane and Perth. The maps will indicate that these are sea-port cities or have sea-ports nearby.

In the year 1920-1921, the imports, for the continent and Tasmania, were valued at £163,000,000; the exports were valued at £132,000,000; and the total trade at £295,000,000. The value of the imports from the United States was £23,826,000, or 24 per cent of the total and the value of the exports to the United States was £11,130,000, or 7.4 per cent of the total exports.

The Commonwealth was proclaimed in 1901; for various

periods of time previous to that year the different states had been separate colonies of the Crown. It is now a Dominion within the British Empire.

Different States Build Railways Independently

The first railway built in Australia extended west from Sydney, New South Wales, and the gage approved for it was 4 ft. 8½ in. At about the same time the same gage was approved for a short line at Melbourne, Victoria. Soon after this, New South Wales changed to 5 ft. 3 in., possibly because locomotives with inside cylinders were considered to be desirable at that time. The then colony of Victoria also changed to 5 ft. 3 in., but not by agreement with New South Wales. Still later, New South Wales returned to the 4 ft. 8½ in. gage, but this time Victoria did not follow, and the two states continued to the present time to build railways of the respective different gages.

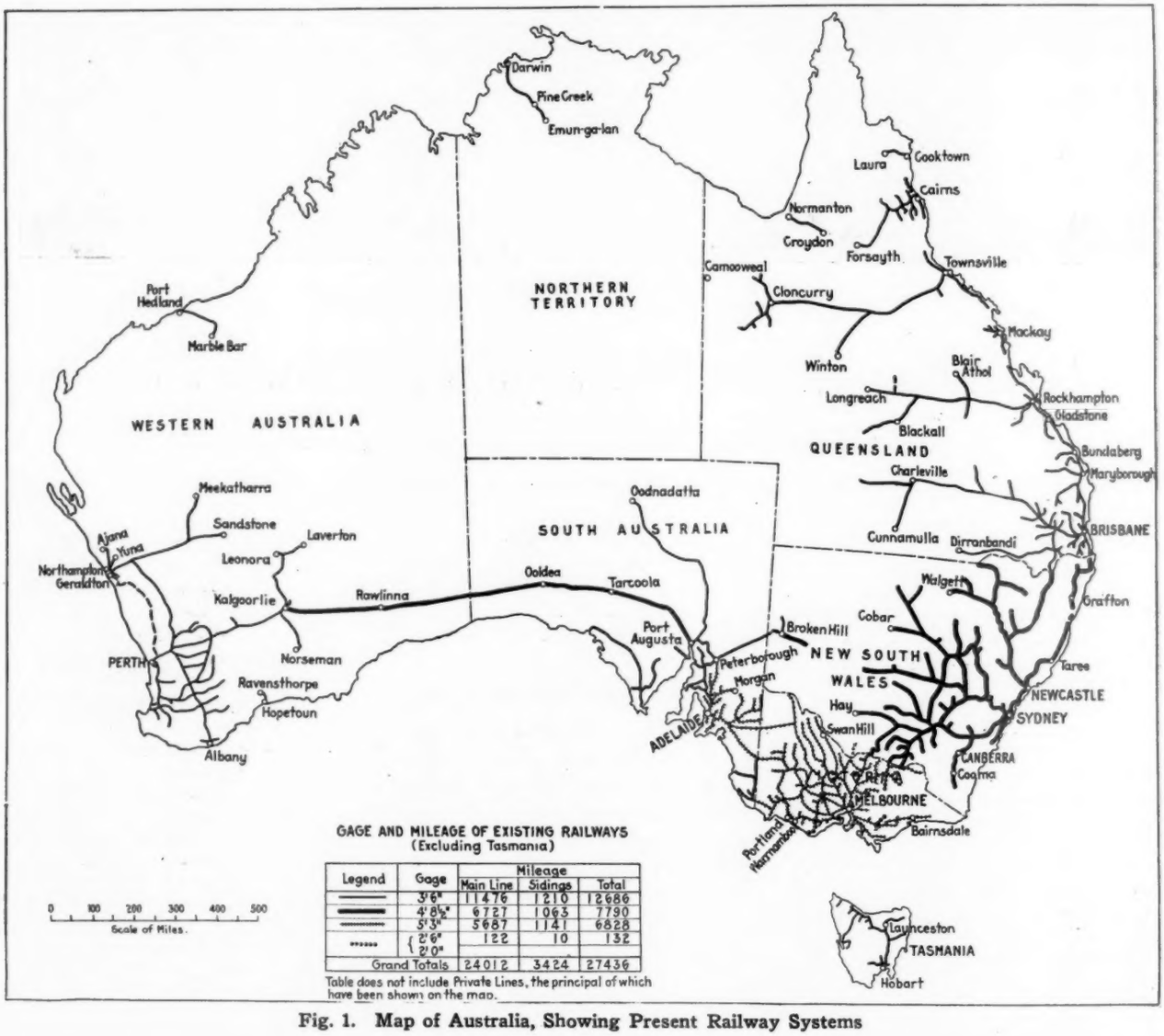
South Australia, joining Victoria on the west, adopted 5 ft. 3 in. for the important south-eastern portion of the state and connecting with Victoria, but used 3 ft. 6 in. gage for the northern lines because this gage was considered to be ample for the needs and cheaper to construct. Queensland and Western Australia used the 3 ft. 6 in. gage from the beginning for the same reasons that South Australia used that gage. The Commonwealth built the Trans-Australian Railway from Kalgoorlie, in Western Australia, to Port Augusta, in South Australia, to connect the western state with the eastern states. This road, 1,051 miles long, was opened for traffic in October, 1917. It is thoroughly up-to-date in its equipment.

There is a small mileage of gages of less than 3 ft. 6 in., but these railways are not of importance.

There is considerable mileage of privately-owned railways and these are generally of the same gage as the state-owned railways with which they connect. These were not considered in the scheme of unification of gages.

The policy of the Commonwealth and the states of constructing and operating railways independently of each other had resulted, to the time of the investigation, in the building of 23,890 miles of main line, 3,414 miles of siding, a total of 27,304 miles, of three different gages, distributed as follows:

Gage	Mileage		
	Main Line	Sidings	Total
3 ft. 6 in.	11,476	1,210	12,686
4 ft. 8½ in.	6,727	1,063	7,790
5 ft. 3 in.	5,687	1,141	6,828
Totals	23,890	3,414	27,304



GAGE AND MILEAGE OF EXISTING RAILWAYS
(Excluding Tasmania)

Legend	Gage	Mileage		
		Main Line	Sidings	Total
———	3'6"	11476	1210	12686
———	4'8½"	6727	1063	7790
———	5'3"	5687	1141	6828
******	2'6" / 2'0"	122	10	132
Grand Totals		24012	3424	27436

Table does not include Private Lines, the principal of which have been shown on the map.

Fig. 1. Map of Australia, Showing Present Railway Systems

These totals indicate that, on a population basis, Australia has about 2½ times the railway mileage of the United States. Compared on the basis of area, the situation is quite different.

It is apparent from the maps, that the railway development in Australia has been carried out by the separate colonies and, later, by the respective states, with the main idea of developing the particular colony or state irrespective of any other colony or state and while the state jealousies still exist, there are indubitable evidences that these jealousies are disappearing gradually.

The harbors which have been developed most extensively are at the state capitals, and it will be noted how the railways of each state radiate from the respective capitals. Such an arrangement will certainly burden the transcontinental and a considerable part of the interstate traffic. The proper solution of this condition seems to be that, if private enterprise is to be barred, the Commonwealth should take an interest in the railway development of the states to the extent, at least, of determining locations of lines to meet, and to develop, interstate communication.

The Present Gages

The railways as they are at present are shown in Fig. 1; the track gages are indicated by the forms of the lines. It will be seen that the entire railway mileage of the extreme northeast state, Queensland, and of the extreme western state, Western Australia, are of 3 ft. 6 in. gage; and about one-half the mileage in South Australia is of the same gage. All the lines in Victoria and about one-half of those in South Australia are 5 ft. 3 in. gage and these are located between the 4 ft. 8½ in. lines of New South Wales and the Trans-Australian Railway of the same gage, except that for 130 miles east of the latter railway the gage is 3 ft. 6 in., connecting with the 5 ft. 3 in. gage of South Australia. In the present line connecting Brisbane and Perth there are five breaks of gage, the distance by the present route being 3,488 miles. Under the present system of operating there are three other places where passengers must transfer and where mail, baggage and express are generally transferred, these being Sydney, Melbourne and Adelaide.

At present the heaviest transfer of traffic is between Victoria and New South Wales. Such traffic is passengers, baggage, mail and express at all times; coal from New South Wales to Victoria and beyond, when there is difficulty with the coastwise shipping; and livestock fodder in the reverse direction, when conditions demand.

Those persons in Australia who have understood more clearly the possibilities of the continent and who have been interested in its development have agitated for some years the desirability of unifying the gages of the railways, and since the Commonwealth was proclaimed in 1901, various estimates of the cost for doing the work have been made by railway officials of the Commonwealth and the states, but without, apparently, mutual understanding as to what improvements and deferred maintenance costs should be included in the cost of unifying the gages. The Commonwealth officials thought that many items, not directly chargeable to unification, had been included in the estimates, therefore the Commonwealth and the states agreed to the appointment of a disinterested commission and to abide by the recommendations of such commission.

It was further agreed that when the work was done, one-fifth of the cost should be borne by the Commonwealth and the remainder to be apportioned to the five states on a population basis.

Changes Recommended

The commission recommended the adoption of the 4 ft. 8½ in. gage as standard. It was considered that any gage greater than 5 ft. 3 in., the maximum in Australia, would not be justified and that any difference in the results to be obtained with the 5 ft. 3 in. over the 4 ft. 8½ in. would not justify any materially greater cost for the former. It will cost considerably less to install the 4 ft. 8½ in. gage because a very large percentage of the axles of locomotives and rolling stock can be saved, as can the 7 ft. ties now in place on a large mileage of the 3 ft. 6 in. gage track.

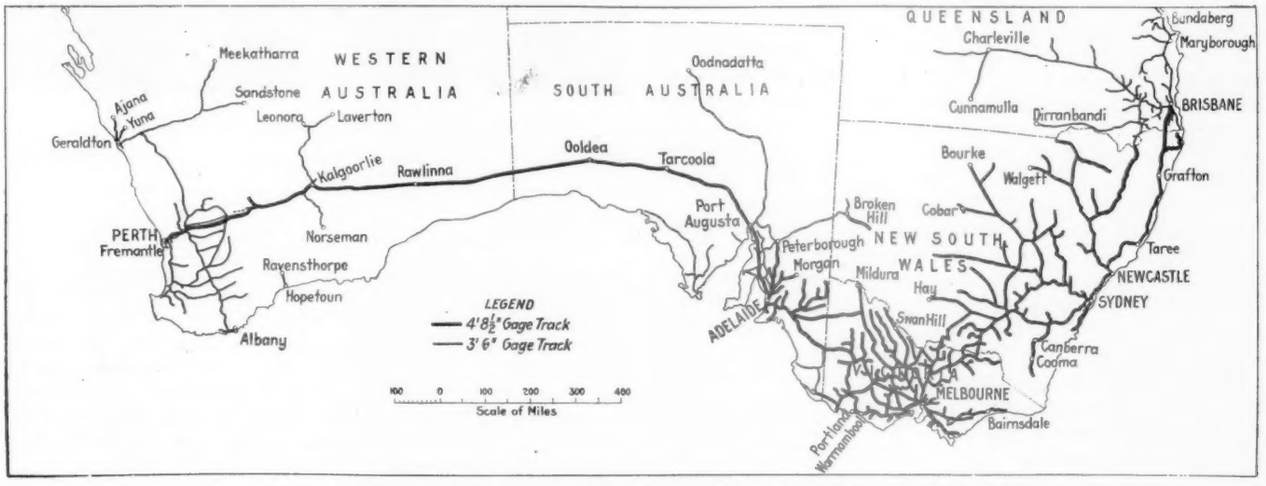


Fig. 2. Showing Changes in Gage Recommended by the Royal Commission

The Prime Minister and the premiers of the five states interested met in early November last and agreed upon the 4 ft. 8½ in. gage as standard. They are to meet early in 1922 to decide what part of the work is to be undertaken and when it should be begun.

Distance to Be Cut Between Brisbane and Sydney

The commission recommended for the main trunk line connecting Brisbane and Perth that a new line be constructed from Brisbane to the Queensland-New South Wales border; the north coast line of the latter state be extended northward to meet the new line, thus shortening the distance between Brisbane and Sydney by 101 miles and obtaining decidedly more favorable gradients; that all of the 5 ft. 3 in. lines in Victoria and in South Australia be converted and the new line along Spencer's Gulf from Adelaide to Port Augusta be constructed, thus reducing the distance 70 miles and providing much more favorable gradients; and the converting of

about 310 miles of 3 ft. 6 in. track, some of it to be changed in location, and the construction of about 70 miles of new track in Western Australia. The estimate for doing this work and providing the necessary locomotives and rolling stock, some of it to be new and some to be converted, was £21,600,000 or, at normal exchange, about $105,000,000.

This expenditure would provide from Brisbane to Fremantle (Perth) by the revised route, rails weighing not less than 80 lb. per yard and roadbed, including bridges, in keeping with that weight of rail, together with the necessary high-grade locomotives and rolling stock. A considerable part of the present mileage making up the revised route is laid with 80 lb. rails and in some places there are 90 lb. and 100 lb. rail.

Can Be Completed by 1930

The map, Fig. 2, shows what the situation will be with respect to the gages when such main trunk line is provided; practically 54 per cent of the present total main line and sidings will then be 4 ft. 8½ in. gage. The work can be completed by 1930 if started promptly, and present indications are that it will be started soon. The necessary financing can be provided and the labor and materials can be procured in Australia.

The remaining 46 per cent of the trackage is 3 ft. 6 in. gage and the commission recommended that these lines be changed less rapidly, that 25 or 30 years might be a reasonable time in which to accomplish the entire undertaking, so that rolling equipment may be worn out without being converted, that wider bridges may be provided when renewals are necessary, that fills and cuts may be widened as conditions permit, and that new alinements may be provided through rugged country where the radii of curves are too short for the broader gage. The more important lines should be converted first and the others to be converted in sections of such length and at such times as conditions may justify.

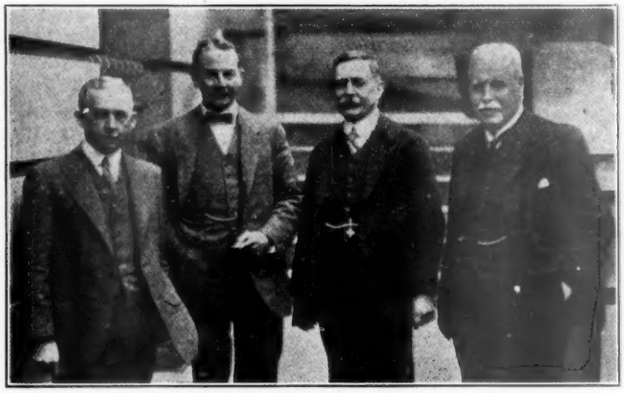
The commission recommends that, in changing the 5 ft. 3 in. lines, one rail be moved in 6½ in., the total difference in the gages; at station platforms, which are very generally elevated, at tunnels and other structures the rails and ties be slewed 3¼ in. so as to maintain the present location of track center. Also, that the rail be moved in long lengths, possibly 100 miles, or more, in two or three days after necessary preparatory work has been done. The rails are T-section, very similar to the sections used in America, and rest directly upon the ties, or tie plates, and a complication in connection with moving one rail on these lines is the fact that the rails are now canted inwardly, nominally 1 in 20 and 1 in 26; however, actual measuring of the canting disclosed that the canting varied from 1 in 12 to 1 in 40. Similar checking of rails laid, normally, flat on the ties, disclosed the fact that these varied from 1 in 60 outwardly to 1 in 70 inwardly. No effort was made to find the extremes of canting and it is probable that the foregoing data do not show the extremes.

With such facts in mind, it was considered to be entirely safe to move one rail in and place it flat on the ties, even where the opposite rail was canted. Eventually, the canted rail can be straightened up by degrees. However, to convince the responsible officials who might doubt the wisdom of this, it was suggested that 25 miles of track, subject to heavy and fast traffic, be arranged with a flat and a canted rail and observation be made.

None of the 5 ft. 3 in. gage locomotives having inside cylinders will be converted; for the others which are suitable for conversion, the main frames will be moved inwardly, thus making necessary narrower fireboxes, front-end spacing castings and cross-frame connection; the wheels re-spaced on present axles, new journals machined and, when outside collars are necessary, the welding on of these collars. For locomotives and rolling stock having trucks the axles will be treated similarly and the cross members of the trucks shortened. A very large percentage of the freight equipment is of the four-wheel type, without trucks, and the axles for these will be treated as the other axles and the location of the pedestal attachments to the body will be changed to give the desired spacing crosswise. It will be a rather easy undertaking to change a large percentage of the equipment.

7 ft. Ties May Be Retained

It was recommended that, when the 3 ft. 6 in. gage is changed, each rail be moved outwardly 7¼ in., one-half the difference in the gages. A large mileage of the narrow gage is on ties 7 ft. long, and for the present wheel loads these ties are sufficiently long for the 4 ft. 8½ in. gage, but it was recommended that ties 8 ft. long be placed two at each rail joint and two intermediate where joints are opposite, or two at each rail joint where joints are staggered. If wheel loads are to be increased to such an extent as to make necessary ties longer than 7 ft., then improvement is involved and makes necessary an adjustment in costs between the owning state and the other parties, the Commonwealth and states, to the agreement. It was the possible saving of these 7 ft. ties which determined, to a great extent, the recommendation of the 4 ft. 8½ in. gage. Under the plan proposed, none of the 3 ft. 6 in. rolling equipment would be converted for use on the broader gage.



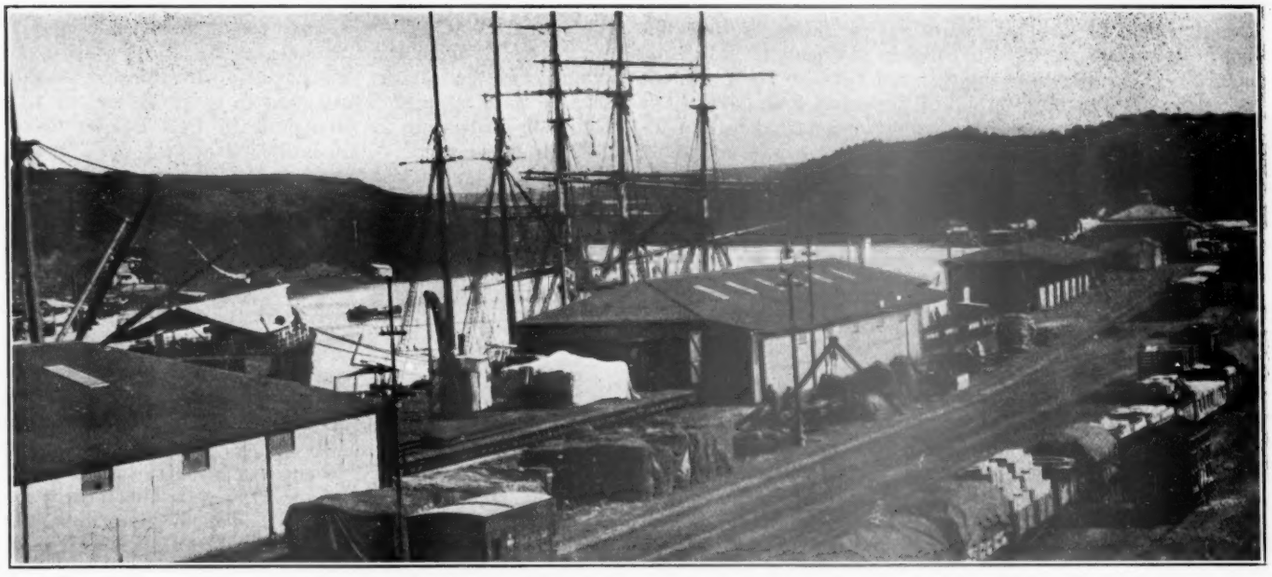
Uniform Gage Commission of Australia

Left to Right: F. M. Whyte and Rustat Blake, Members of the Uniform Gage Commission; Littleton E. Groom, Federal Minister for Works and Railways; and N. G. Bell, Commissioner of the Commonwealth Railways

It was recommended that the work in each state should be executed under the supervision of the same offices as have charge of the corresponding work now, but that there be placed in general control of the entire undertaking a director who will have almost absolute authority in determining what shall be done, and when, and in the accounting.

Positive recommendations were made against the use of a third rail or a mechanical device and emphasis was placed upon the desirability of centering attention upon the problem of actually changing the gage of track and rolling equipment.

In Nova Scotia and New Brunswick the railroads celebrated New Year's day by a big snowstorm. On Sunday night five Canadian National trains were reported snowbound in the Folleigh mountains section. There was a complete tie-up of traffic between Springhill Junction and Truro. One train was covered with huge snowbanks. Four were stalled near Londonderry. Crews of snow shovellers were sent out from Moncton and Truro to dig out the trains. The night expresses out of St. John and Halifax were blockaded.



Railway Terminal and Harbor, East London, South Africa—Photo by Underwood & Underwood

South African Railways Progress Despite Deficits

Electrification and Other Projects Advancing Regardless of Unfortunate Earnings Position

By M. T. Griffin

THE PRESENT unfortunate position of the South African Railways, the government lines, was epitomized recently in a statement by the famous South African statesman, General Jan C. Smuts. He said:

"The railway situation is most grave, revenue having fallen approximately £500,000 during the past six months below the amount estimated. During the past year £28,348,000 was the total railway expenditure, being an increase of £13,800,000, or 95 per cent, over (the fiscal year) 1913-14. Of this increased expenditure over £10,000,000 was accounted for in increased salaries, wages, allowances and war bonus. At the present time depression is weighing like an intolerable load on this country—but I do not despair of the future. The conditions in South Africa are sound, the country not being handicapped, as so many others are, by huge war debts."

THE GOVERNMENT of the Union of South Africa operates 11,478 miles of railways. These lines connect with other lines to the north and, because of the extent of their development, set the standards as to gage, equipment and practices for the future railway development of the southern part of the continent.

They are suffering from the unfortunately too well-known malady, deficits. High costs, largely wages, and inadequate income are the outstanding causes.

Extent of the Railways

The government of the Union of South Africa owns and controls practically all of the railroads of the country. These government lines have a total mileage of 9,559, of which there are 4,254 miles in the Cape of Good Hope, 1,319 miles in the province of Natal, 2,644 miles in the Transvaal and 1,342 miles in the Orange Free State. There is also a mileage of 1,292 in Southwest Africa which is being operated at present by the South African Railways. There are 651 miles additional of privately owned railways throughout the Union.

Railway construction in South Africa began in 1859, when a two-mile line was built at Durban on the east coast. Progress was slow. In 1873 the railways in Natal, totaling 63 miles, were taken over by the government. After the Boer War the state railways of the various states which make up the Union of South Africa were consolidated but it was not until 1910 that they all came under unified control. The earlier railways were built to standard gage, i. e., 4 ft. 8½ in., but this gage was reduced later to 3 ft. 6 in., which is now the standard gage for South Africa. There is also a considerable mileage of narrow gage, 2 ft. 6 in. and 2 ft. lines.

The Effect of the War

During the war the South African Railways were fairly well maintained and, indeed, a considerable mileage was relaid with heavier steel imported from the United States. Freight rates were advanced considerably during the war and now in the period of depression, when the railways are losing heavily, shipping interests are much agitated on the subject of high freight rates and are clamoring for reductions. Passenger rates were increased only by the application of a 2½ per cent surcharge on regular and suburban fares and 5 per cent on trip, bearer, mileage, coupon and season tickets.

Wage payments were increased tremendously, as shown by

the statement of General Smuts. These increases were due not only to increases in actual money payments to individual employees but also to the larger numbers of workers made necessary by the application of the eight-hour day. The eight-hour day has, however, recently been modified to include only those employed continuously and does not apply to workers whose work-day may include periods of idleness. Some saving will doubtless be effected by this change.

Employees of the South African Railway at the end of the last fiscal year totaled 89,858, something less than half of whom were of European extraction. During the war a cost of living bonus was added to the wage payments of employees. This bonus was first applied to native workmen and, naturally, it is from them that it was first removed. This bonus was, therefore, reduced in the case of native employees by 25 per cent on April 1 and further similar reductions each three months thereafter.

Union labor on the South African Railway is mostly European and it is said that, while they oppose wage reductions to some extent, they nevertheless realize the position of the railways and the necessity for reducing operating costs.

The Financial Situation

The financial position of the railways is unhappy. The deficit for the fiscal year ended March 31 was $6,186,644. The accumulated deficit of the government railways, harbors and steamships on that date was $12,630,576. During the first six months of the present fiscal year a further deficit of $4,860,000 was piled up by the railways.

All this looks rather discouraging, but there are one or two matters that make the outlook less unpleasant. One is that the monthly deficit of the railways has showed a tendency to decrease of late months and, furthermore, that operating expenses in the first five months of the current fiscal year showed a decrease of 29 per cent over the same period of last year.

Other Railways of South Africa

North of the Union of South Africa lies Rhodesia, which is also British. Its principal railway, which has a mileage of 1,406, is also of 3 ft. 6 in. gage and connects with the South African Railways, working in close co-operation with them.

The South African railway authorities are exercising jurisdiction for the time being over the railway lines of what was German Southwest Africa. These lines have direct connections with the South African Railways and total some 1,400 miles, of which about 1,000 miles is of the standard 3 ft. 6 in. gage. They will probably, now that the German yoke has been shaken off, be brought into increasingly close co-operation with the South African Railways.

British South Africa has roughly the shape of an inverted V. At the apex is the Belgian Congo; to the west is Portuguese West Africa and to the east is Portuguese East Africa. Through Portuguese East Africa there are two railways which connect the railways of the British territory with the east coast. One of these lines terminates at the port of Laurenço Marques and the other at Beira. A railway beginning at the seaport of Benguela, in Portuguese West Africa, is being pushed eastward to a connection with the Rhodesia Railway in the southern part of the Belgian Congo.

Thus is the Dark Continent being opened up. There is yet a considerable distance between the rail head on the upper Nile and that in the Belgian Congo. A part of this intervening country can be crossed in steamers on the lakes, but the completion of a through all-rail Cape-to-Cairo route probably still lies some distance in the future.

Railway Activity in the Union

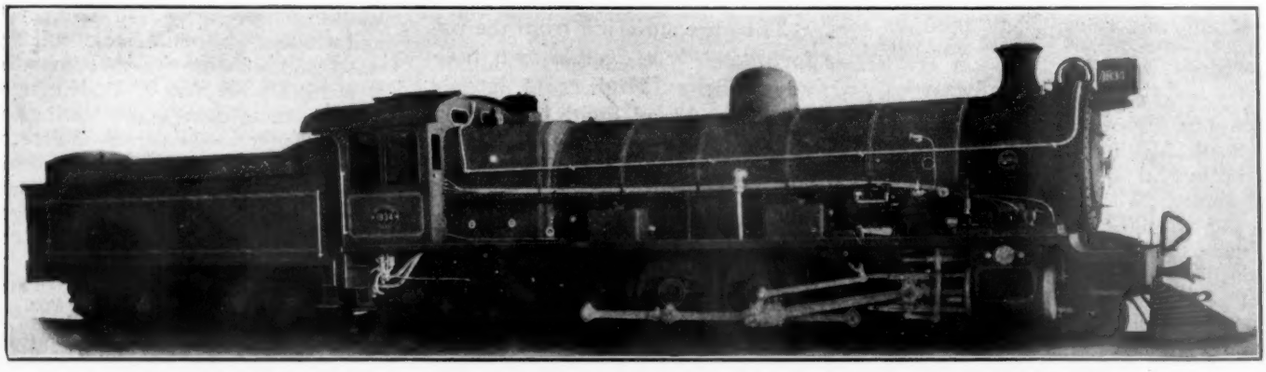
The South African Railways have of late entered rather extensively into the construction of grain elevators. At the end of the last fiscal year contracts had been let for the erection of large terminal elevators at Durban and Capetown and for 34 at various interior points. The purpose of this construction is, naturally, to encourage the raising of wheat and to increase the traffic of the railways. The railway administration has installed a few road motor lines to supplement the activities of the railways.

The government has recently floated successfully an issue of $24,300,000 six per cent bonds in the London market the proceeds of which are to be used for rivers, harbors and irrigation. The most important project in the way of capital expenditures on foot is the electrification of two sections of the railway—one between Glencoe Junction and Pietermaritzburg and the other from Capetown to Simonstown. The former is a single-track line 171 miles long with heavy gradients. The latter is a suburban passenger proposition exclusively. The cost of this work is estimated at $21,313,044.

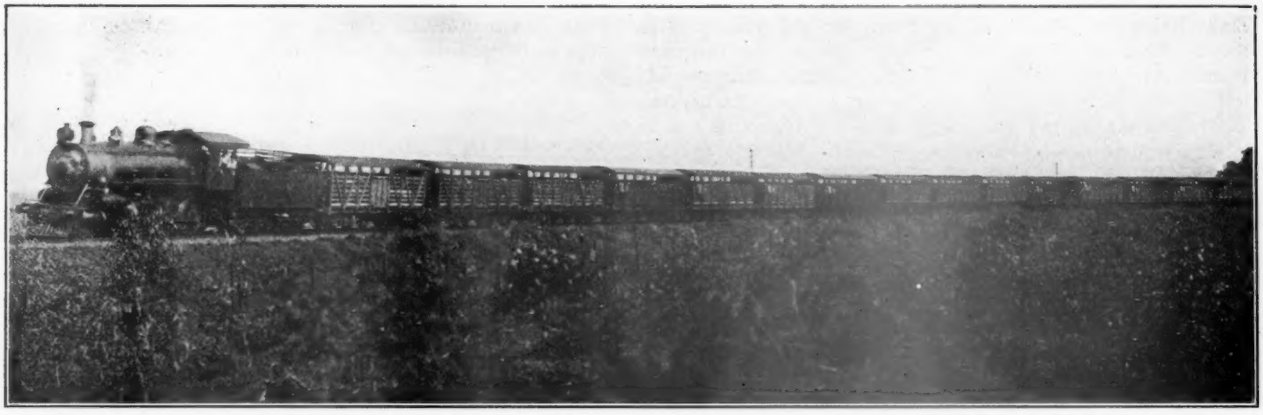
There has been considerable agitation recently about extending the railways and linking them up to a greater extent with other roads in South Africa, but the general manager in a recent conference expressed the opinion that in the present state of the money market and conditions generally, any considerable activity along these lines is financially impracticable and commercially unwarranted.

Opportunities for American Goods

South Africa is primarily British insofar as its railways are concerned even in those sections under control of another foreign power. Consequently as long as British manufacturers are able to compete in point of price and speed of delivery with American concerns, British goods are likely to be favored. There have, however, been a number of purchases made in recent years in this country. The surest way for America to secure a foothold on the continent as an exporter of railway equipment and supplies would seem to be by financing and building some of the railway lines which are projected or which naturally suggest themselves in some of the relatively undeveloped country lying between Rhodesia on the south and the mouth of the Nile on the north.



Mountain Type Locomotive for the Railways of South Africa, Built by Baldwin Locomotive Works



A Stock Train on the Paulista Railway, Brazil

Nor Do South America's Roads Escape Adversity

High Costs and Inadequate Revenue Seemingly a World-wide Epidemic—Future's Outlook Bright

By James G. Lyne

IN EXAMINING the railway situation in South America attention will naturally focus on the three countries having the greatest mileage, and railway systems comparable to our own in length and importance, viz., Argentina, Brazil and Chile. In these countries the situation of most of the carriers will be found in most cases to be the same as of the railways the world over, viz., unhappy, because of high costs, low rates, business depression and resultant decreased earnings. The physical aspects of South America's railways were described in considerable detail in a series of articles by John P. Risque, which appeared in the *Railway Age* during the last part of 1920 and the early months of 1921. The present article will be limited to a general discussion of the situation that has arisen since the publication of these articles.

TROUBLE in the form of high wages, low rates, scanty traffic and limited credit besets South America's carriers. Where new railways are needed so urgently, however, starvation of existing roads cannot conceivably be long permitted. Additional effort on our part toward supplying these countries with their urgent requirements of capital for additional railway development, railway equipment, trained personnel and assistance in adopting more efficient methods would redound to their benefit and ours as well.

Argentina

Argentina's railways, which total some 23,000 miles, are owned, for the most part, in England and are operated by Britons. There is one state-owned line of considerable importance and one line owned in France. These roads vary greatly in gage and in standards generally. None of the companies has improved its financial position of late. In their annual reports for the fiscal year ended June 30, two of the British companies, the Buenos Ayres Great Southern and the Buenos Ayres Western, declared that the year was the most unsatisfactory in their history. Both had to dip into reserve to pay 4 per cent dividends on their common stock. The Central Argentine, one of the strongest systems in the country, paid no dividends on its deferred common stock, whereas it paid 6 per cent the previous year.

Perhaps the most noteworthy development during the year in Argentina, however, was the clash between the British railways and the government over increases in freight rates. Because of high wages and high cost of materials combined with a heavy slump in traffic, several of the companies during the early part of the year sought government sanction for increased rates. Anticipating the granting of this authority they advanced their rates. After months of delay the government on August 21 refused to sanction the increase and forced the companies to return to shippers the amounts collected in excess of the prescribed rates. This action came as a complete surprise. Ten days later, however, on August 31, a new decree was issued allowing an increase of some 30 per cent. Then, on October 4, the government again reversed its decision and suspended the increases. Here the matter stands. The question will probably come before the Supreme Court of Justice before it is finally settled.

The companies are basing their case on what is known as the Ley Mitre (Mitre Law) which limits the net returns of foreign owned railways to 6.8 per cent of invested capital. The companies hold that, since they are not earning this 6.8 per cent, they have a right to raise their rates. They are offering ample evidence of their precarious financial situation.

As a Market for Railway Equipment

The government, on the other hand, takes the view that prevailing economic conditions are a burden on the whole community and that the railways should assume their losses as the agricultural interests and business generally are assuming theirs.

There is but one important market in Argentina for

American railway equipment and supplies and that is the State Railways. These railways are for the most part in the northern section of the country and do not run into Buenos Ayres. In fact, traffic from the State Railways has to pass over the rails of two private lines to reach the capital. The State Railways have 3,226 miles of line and are of meter gage. That they offer an excellent market for American equipment is proved by the order for 85 locomotives and some 2,000 cars, which was placed in this country recently in the face of strong foreign competition. The bulk of the railways, however, as has been noted before, are British, and inclined to do all their purchasing in the mother country regardless of any consideration.

Argentina lends itself to railway development because of its freedom, speaking generally, from physical barriers and its rich agricultural lands. A number of projects toward further expansion are contemplated or under-way, two of them to connect up with the Chilean State Railways and one with the railways of Bolivia. The great obstacle toward a really comprehensive system is the diversity in gage and other standards, and in the rather intense competition of the several railways which makes co-ordination difficult.

Fuel presents a perplexing problem to the railways of Argentina, as it does to those of practically the whole continent. Wood is at present the principal fuel used, but with the development of the country's oil fields, oil will probably come into more general use.

British railways, of course, dominate in the design of equipment and the methods of operation—this in spite of the fact that Argentina is strikingly like the United States from a railroad point of view. The conclusion is inescapable, therefore, that any opportunity which may exist for American enterprise to enter the field and show the relative superiority under such conditions of American practices and American equipment should be taken advantage of. Unless some such action is taken the great bulk of Argentina's railway purchases will in the future, probably, as they have in the past, be made in England.

Chile

From a railway point of view Chile is unique. It occupies a strip along the Pacific almost 3,000 miles in length and of an average width of 90 miles. The railways are state-owned, with the exception of some British lines serving the nitrate fields of the desert north. A north and south line is provided for practically the entire length of the country, but mainly for strategic reasons—sections of this line to the north and south, particularly to the north, of the population center around Santiago and Valparaiso are practically without traffic.

The railways of Chile, and indeed the whole continent, have suffered from the general economic depression. The state, which finances the railways, has been particularly hard-hit because of the decline in value of nitrate, the country's chief stock in trade. Wages and other expenses are higher proportionately.

Owing to the scarcity of fuel and, in many cases, water, and to the mountainous character of the country, the Chilean railways naturally lend themselves to electrification. The outstanding action taken in this direction was the granting of a contract to the Westinghouse Electric & Manufacturing Company for the electrification of the line from Valparaiso to Santiago and of the branch to Los Andes (connecting with the Transandine Railway). If this installation proves successful other work along the same line will doubtless be undertaken, which will provide further opportunities for American enterprise. An order for 20 steam locomotives placed in this country during the year bears additional proof of the satisfaction which former purchases in this country have given. The Nitrate Railways (the British railway in the North) also plans some work along this line. Chile's railways, like those of Argentina, also suffer to some extent from lack of uniform gage, large capacity cars and anything approaching uniformity.

Brazil

Brazil, with a territory larger than that of the United States, has only some 17,000 miles of railway and this is largely concentrated relatively near the coast in the southern part of the country. A large portion of this mileage is foreign-owned, although there seems to be a tendency in the direction of greater activity on the part of the federal and state governments in railway building and extension; in view of the tremendous field for further development it would not seem strange if the state-owned lines some day completely dominated the situation. At any rate a country so grossly underdeveloped from a point of view of transportation offers a prospective field of tremendous importance to railway genius as well as to manufacturers of the things that go to make up railways.

The capacity of many of the country's railways has been heavily taxed in the past by inadequate facilities. These roads suffered from under-maintenance during the war, as did the railways throughout the world. Now necessary additions to rolling stock and other facilities cannot be undertaken because of inadequate returns resulting from a decline in traffic caused by the slump in foreign trade and from rates not sufficiently high to provide for increased costs, and because of the decline in exchange value of the country's currency in terms of those countries from which suitable railway equipment can be obtained.

In such times government railways are practically the only ones which, because of no obligation to earn a profit and because of more extensive credit, can afford to bring about improvements. Consequently the Paulista (owned by the state of Sao Paulo), which brought some 28 miles under electrical operation during the year, was one of the few roads which was able to progress greatly.

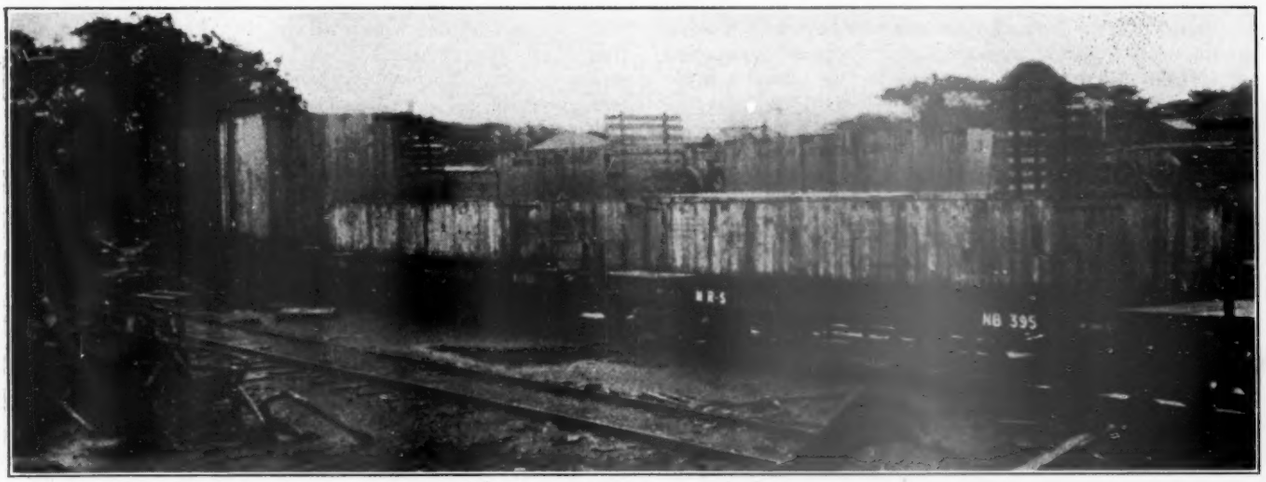
There are any number of projects on foot in the country for the extension of railway lines. The return of favorable times alone is awaited. Brazil is another country like Argentina where American extensive methods of railroading would probably be more effective than European intensive practices. Furthermore there is not the same extent of European domination in railway ownership in Brazil that there is in Argentina and the present development of transportation facilities is much less extensive. It would seem, consequently, that by a sincere attempt to help Brazil solve her railway problems both by advancing capital and by lending our technical skill, our opportunities for supplying equipment and trained men to the railways of the country should tend to increase greatly.

Bolivia

Bolivia is interesting from a railroad point of view not so much because of her present railway facilities but because of developments during the past year which point to the importance of the railways of that country in the development of the southern part of the continent. Bolivia is connected with the Pacific by three rail routes but these are not at present of any great importance because traffic between the interior and the coast is relatively light.

The significant development of the past year has been the awarding of a contract by the Bolivian government to an American company for the construction of a line 126 miles in length connecting the Bolivian railways with those of Argentina. When this line is completed, Buenos Ayres will be connected with the Pacific coast through Bolivia by a railway system of uniform meter gage. The distance between New York and Buenos Ayres will be reduced materially and Bolivia, thus placed on a transportation route which is

(*Continued on page* 117)



Locomotives Built by the American Locomotive Company Arriving at Caloocan Shops, Manila Railway

Commerce Bureau Improves Service to Exporters

Many Valuable Services Offered Exporters of Railway Supplies—Work in Hands of Experts

By James G. Lyne

"WE ARE ONLY BREAKING into the exporting business and without your help we should not have known how to start." Thus an American manufacturing concern wrote to the Bureau of Foreign and Domestic Commerce. With some 900 consuls and other representatives scattered over the face of the earth in every important city and country, this Bureau has a foreign organization which is greater than that of any private industry. This great body of men, with the home organization at Washington, is today offering to American exporters a foreign service which no single industry could afford to maintain.

For a number of years the Bureau has been of great service to American exporters in giving them information of value regarding foreign markets for their products. During 1921, however, under the stewardship of Secretary Hoover, the Bureau has been reorganized in a manner which should increase its service many fold.

Commodity Divisions With Experts in Charge

Prior to the reorganization the activities of the Bureau were subdivided on a territorial basis—that is to say, the Latin American division collected and co-ordinated reports from representatives in Latin America, the Far Eastern division performed a similar service insofar as the Far East was concerned, and so on. Now superimposed upon these geographical divisions are commodity divisions. In charge of each commodity division is an expert in the marketing of that commodity.

A NEWLY ORGANIZED division of the Bureau of Foreign and Domestic Commerce at Washington has as one of its particular duties the fostering of America's foreign trade in railway equipment and supplies. This division is headed by men who know the supply business and who have traveled widely abroad investigating markets for American goods. Nine hundred representatives of the Bureau throughout the world will make any reasonable investigation requested by the division.

A man, expert in, say, commercial geography, may be in a position to assemble some information of value to an exporter of railway equipment and supplies, but an engineer with experience in car manufacturing and in foreign marketing will be in most cases of infinitely more service to the business. A man with such training and with foreign experience knows the nature, the advantages and disadvantages and the possible foreign market for American equipment and he also knows something of the peculiarities of railroad practice abroad which affects design and business methods. Just such a man is in charge of the Bureau's Industrial Machinery Division, which is looking after the exports of railway supplies.

An investigation has disclosed the fact that 17 per cent of America's production of industrial machinery, including railway supplies, is normally exported. This 17 per cent is sufficient to represent profit or loss in the industry and would seem well worthy of being maintained and increased even at the expense of considerable effort. It is the business of the Industrial Machinery Division of the Bureau to assist in directing this effort along the most intelligent channels.

Service of Value to Large and Small Companies Alike

Some of the important car and locomotive companies of the country are today pretty well organized in the foreign field and they, speaking generally, do not have as great a need of the services of the Bureau as some of the smaller companies or houses which are new in the foreign field. It

must not be supposed, however, that the Division cannot be of service even to the largest companies. An officer of an American concern manufacturing railway equipment, coming from Australia not long ago, met in China a repre-

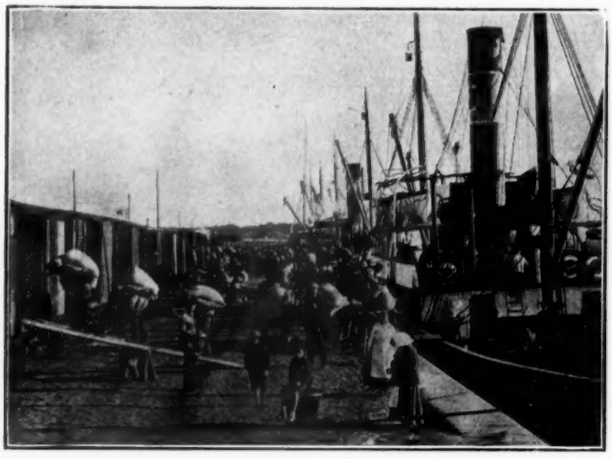


Photo from Underwood & Underwood, N. Y.

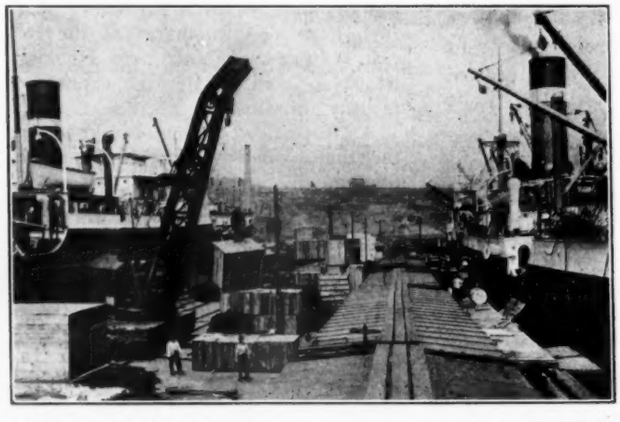
American Supplies for Russia at Riga

sentative of the Bureau of Foreign and Domestic Commerce. While in Australia, the manufacturer said, he had happened upon a publication called Markets for American Railway Supplies and Equipment in Australia, a report by Trade Commissioner Frank Rhea, which report, had he seen it before, would have saved him his trip to Australia.

Two conclusions naturally suggest themselves after hearing this anecdote—one is that the Bureau is in possession of some information of the greatest value to manufacturers of railway equipment and the other is that there must be the closest contact on the part of these manufacturers with the representatives of the Bureau in this country in order to make sure that the government's free service is utilized to the utmost.

Expert Advice From Those Who Have Studied Foreign Railroads

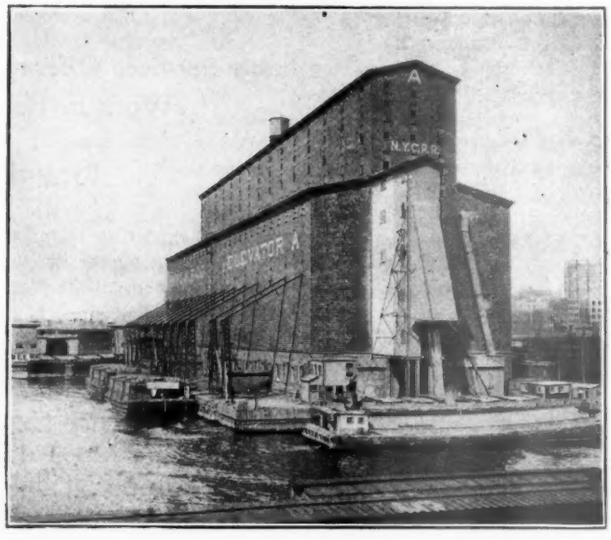
One of the Bureau's trade commissioners traveling in Java recently found a railway there busily engaged in breaking



Loading Freight from Train to Steamer at N. Y. C. Piers, Weehawken, N. J.

up American chilled cast iron wheels which had been purchased during the war. Upon investigation it developed that the country was extremely mountainous and that there were no airbrakes. The method of braking on mountain grades was to set the brakes on four or five cars as tightly as possible and to slide the wheels all the way down. Chilled cast iron wheels are not meant for such service and naturally were unsatisfactory. This representative who has traveled widely and knows of the peculiarities of many countries and their railways is in a position to advise American concerns just what matters must be considered in designing and selling railway equipment abroad. Only by being so informed can American houses export equipment and supplies designed to meet the operating conditions in foreign countries and only by sending abroad equipment so designed can American goods hope to compete favorably with European equipment built by those who have studied local conditions.

The Bureau's representative who told of Java's experience with chilled iron wheels has traveled extensively in the Far East investigating the markets for industrial machinery. Prior to that time he spent a number of years in China. He is well acquainted with American and foreign railway supplies. His opinons on foreign markets for our equipment are those of an expert and yet he has an office in Washington where at any time he is prepared to meet American manufacturers and help them solve their export problems—and these services are given free of charge. Further than that he can call upon any or all of 900 commercial attachés,



Huge Grain Elevator at New York for Loading Direct to Ocean-Going Vessels; Sixtieth Street Yards, New York Central

trade commissioners and consuls to furnish information which he cannot give himself.

Reference Material at Washington

The Bureau has also a vast amount of information on hand at Washington which is ready for instant reference. An example of such material is an up-to-date report from all foreign representatives on railway conditions in their countries which is now being compiled. This report will contain the following information concerning the railways of every country: Mileage; number of locomotives; number of each kind of cars; capacity of cars and trains; clearances; signal systems used; shop facilities; freight and passenger traffic during a recent given period; revenues and expenses; number of each class of employees; proposed additions, extensions, improvements and new construction, and an estimate by the representative on the ground as to what the chances are that American houses may be able to obtain a share of this business and how they should proceed to do so.

Will Make Special Investigation When Desired

If any American concern requests it, the Bureau will instruct one of its experts to make any reasonable investigation along the lines of its business in the country for which the information is desired. An instance of this has come to our notice in the form of a copy of a long letter describing the requirements as to signals of a Chinese railway which was on the point of asking for bids. This letter was written by the American trade commissioner at Peking and addressed to a signal company in this country. It goes into such matters as: The method of operating trains in China, wherein it differs from our train dispatching system and why it is probably better suited to Chinese conditions than is the American system; the fact that the saving of a few employees by the adoption of certain methods of signaling would not be a deciding factor because of the relatively low wages; the physical condition of the railway; the probabilities of the adoption of the most modern signals as opposed to older forms. In fine, the company could not have expected to have received a more comprehensive and helpful report from a paid representative—yet this and similar services the Bureau is offering to American business without charge.

Reference is made above to an extensive survey of the potential markets for American machinery (including railway supplies) in the Far East. Studies of a like nature have been made before. When there is a demand by business for additional investigations, they will be made again. If—merely for example and not as a suggestion or a report of fact—a number of American concerns manufacturing draft gear should require detailed information prior to launching a sales campaign in South America the Bureau would, if it were satisfied of the advisability of such action, detail an expert to make an exhaustive study of the probabilities for the success of such a campaign and the course of action which would likely bring the desired results.

Advice on Tariff and Legal Matters

Further than giving information concerning design and related matters the Bureau also offers the experience of its expert staff regarding sales problems, customs duties, legal difficulties, matters of financing and shipping. Through cooperation with the Department of State difficulties with customs authorities are being straightened out with a celerity which would be impossible for an agency not directly connected with the government.

One or two instances of what the bureau is doing for other industries, but which it would just as readily do for railway equipment manufacturers, may be of interest to show in how many ways it may be of service:

An American concern manufacturing a measuring device was endeavoring to do business in Sweden. Efforts to obtain a sale for its product were well-nigh frustrated by a competing German concern which, in true German style, circulated propaganda to the effect that the American device had not been approved by our Bureau of Standards. Now it happens that in this country approval by the Bureau of Standards is not required. This authority is vested in the sealer of weights and measures of the several states. The manufacturer appealed to the Bureau of Foreign and Domestic Commerce. A statement was obtained from the Bureau of Standards to the effect that its approval was not required and from the sealer of weights and measures of the state of New York to show that the device in reality did have official approval. Thus the Bureau enabled the American manufacturer to set at naught the unworthy efforts of his German competitor.

Forced to Do $20,000,000 of Business

Representatives of the Bureau in China several years ago saw what they believed to be a vast field for the sale of a certain line of machinery. They endeavored to interest American manufacturers, but to no avail. They persisted. Finally one concern which they had been trying to interest in the matter consented to try the Chinese market to avoid the continual importuning of the Bureau's representatives. To date more than $20,000,000 of this machinery has been sold in China.

An American coal salesman in Madrid recently was introduced to local business men by the American commercial attaché. He secured orders totaling $200,000.

Specifications which were furnished through the activity of the Bureau's representative resulted recently in the sale of $2,500,000 of electric equipment in Australia. Countless cases of this kind could be instanced.

Personal Contact With Manufacturers Necessary

No one familiar with the work of the Bureau can fail to realize the importance of its work to America's foreign trade. The Bureau's potentialities as a builder of trade, however, are utilized in very small proportion. The Bureau needs contact with business. It needs this contact not only that it may impart information it already has but, in addition, that it may have a broader conception of what information business needs. It must know from the manufacturers themselves that they are interested in selling their products abroad if there is a promising market. Its agents must know more about the qualities of American products with which their past experience has not familiarized them.

Nor Do South America's Roads Escape Adversity

(*Continued from page* 114)

practically assured of popularity, should benefit materially. A railway connection with the Brazilian coast to the east, moreover, seems a not far distant probability.

In Conclusion

Detailed reports concerning the present situation of the railways in all the South American republics would be a task beyond the scope of our present limitations. The railways in the northern part of the continent, with the exception of Peru, are relatively unimportant and afford no proper basis for comparison with the railways of the south. Many of them are narrow gage lines of light traffic which belong in the category of tramways rather than railways. Others are little more than industrial lines. Doubtless in a few instances there have been developments worthy of notice which have escaped attention here. Most of these can be covered, however, by the following general statement: As a whole the railways of South America are meeting with difficulties because of high costs and low rates; by-and-large they are at present in need of increased maintenance allowances, new equipment and new facilities; they need a greater degree of standardization; they could probably adopt in larger measure American methods and American equipment and could employ larger numbers of American railroad men to their advantage as well as ours; and, when all is said and done, the opening up of South America by railroad has only begun.

Statistical Section

An Analysis of the Railway Statistics for 1921. By Julius H. Parmalee.

Locomotive Market in Quiescent State During 1921. By F. W. Kraeger.

Freight Car Orders During 1921 Lowest Record. By F. W. Kraeger.

Passenger Car Purchases Small During 1921. By F. W. Kraeger.

Dividend Changes on Railroad Stocks in 1921. By Charles W. Foss.

Receiverships and Foreclosure Sales During 1921. By Charles W. Foss.

Signal and Interlocking Work Shows Slight Gain. By K. E. Kellenberger.

Railroad Telegraph and Telephone Activities. By J. H. Dunn.

Railway Lines Abandoned During the Year 1921. By Milburn Moore.

Not Much Activity in New Construction in 1921. By Milburn Moore.

An Analysis of the Railway Statistics for 1921

Extent of General Business Depression Reflected in the Decline in Traffic for the Year

By Julius H. Parmelee
Director of the Bureau of Railway Economics

DECLINE IN TRAFFIC was the outstanding feature of the railway year 1921. It was perhaps the most important of several features of the year which were a distinct disappointment. Following upon the heels of a year in which the railways of the United States broke all records for service rendered, the fact that in 1921 they were called upon to furnish a much lessened service is a matter of serious regret not only to them, but to the nation as a whole. No criticism rests upon them, however, for the level of railway service in any year is gaged solely by the amount of freight and passenger traffic offered.

As to the financial results of operation, the railways fared much better than in 1920. During eight months of 1920, however, they had the United States government to fall back upon, in the form of a guaranteed net income, whereas in 1921 they were upon their own resources; that is, their earnings were limited to their actual receipts from operation. Adding the government guarantee of 1920 to the net operating income of that year, the total net income for 1920 was greater than in 1921 by more than $200,000,000.

In brief, the railways in 1921 handled a freight traffic about 22 per cent less than in 1920, and a passenger traffic about 19 per cent less. Their gross revenues declined $600,000,000 from the high point reached in 1920, in spite of the fact that in 1921 the increased rates were in effect the whole year, compared with only four months in 1920. By exercising the strictest economy, however, the railways reduced their operating expenses nearly $1,200,000,000. Net operating income was thus increased from a bare $62,000,000 in 1920 to approximately $616,000,000 in 1921. This represented a rate of return on railway value of 3.3 per cent.

THE FREIGHT TRAFFIC in 1921 was about 22 per cent less than in 1920; passenger traffic about 19 per cent less.

The gross revenues declined $600,000,000 from the high point in 1920. Operating expenses, by strictest economy, were reduced nearly $1,200,000,000, compared to 1920. Net operating income increased from $62,000,000 in 1920 to about $616,000,000 in 1921—a rate of return on railway value of 3.3 per cent.

Statistics Up-to-Date

In looking over the results of railway operation in 1921, from the statistician's point of view, it is interesting to note how much more completely and currently the statistical record of railway activity is now maintained than in the past. Every year during the past few years has represented an advance in this direction, so that today it is possible to secure statistics as to weekly freight car loadings within 15 days, as to monthly financial results within 30 days, as to the number of employees, wages, and general statistics of physical operation within from 30 to 60 days, and as to commodity movements every quarter. Contrast this situation with that existing as little as five years ago, when no statistics were reported for less than annual periods except financial results only, and six months to a year elapsed after the close of any annual period before the results of that period were in hand. In other words, the statistical record of railway operation, as spread out before the present-day student of railway activity, offers him a most interesting and significant series of pictures which portray both the level and the trend of railway affairs, and keeps him supplied with current information.

Financial Results

The year 1921 was the first complete calendar year, since the United States entered the war in 1917, during which railway operation was in the hands of the companies. It was the first year, since 1917, of operation without government guarantee of any kind. It was, furthermore, the first complete year since the passage of the Transportation Act, since the establishment of the Railroad Labor Board, and since the present freight and passenger rate levels became effective. For the first time in several years, no general changes in the rates occurred, although many local and regional rate adjustments were made throughout the year.

TABLE I

	1921	1920
Total operating revenues	$5,625,000,000	$6,225,403,000
Total operating expenses	4,650,000,000	5,826,197,000
Taxes	288,000,000	281,380,000
Net operating income	616,000,000	62,264,000

All the statistics contained in the several tables here presented apply to railways of Class I. Table I is a condensed

comparison of the financial results for 1921 with those for 1920. As this article is necessarily prepared before the end of December, the entries for 1921 are partially estimated and are, therefore, subject to revision.

Operating Revenues

Operating revenues in 1921 stood at $5,625,000,000. This was a decline of $600,000,000, or 9.6 per cent, from 1920, but was some $441,000,000 greater than in 1919. With the single exception of 1920, railway revenues in 1921 were the greatest in American railway history.

In comparing the revenues of 1921 with those of 1920, it should always be borne in mind that the present increased level of rates was in effect during the whole of 1921, while in 1920 it was effective only from August 26, or a little more than four months. This fact emphasizes the decline in the revenues of 1921. The general freight and passenger rate increases, made effective by the Interstate Commerce Commission on August 26, 1920, was estimated at about 33⅓ per cent for freight, and something over 20 per cent for passengers, allowance being made in the latter case for the Pullman surcharge of 50 per cent. Had the traffic of 1921 been maintained at the level of 1920, the operating revenues would have been greater than in 1920 by some $700,000,000, instead of being $600,000,000, less. The difference between the actual revenues of 1921 and what those revenues would have been on the basis of the 1920 traffic is the sum of these two amounts, or $1,300,000,000. The great bulk of this decline of $1,300,000,000, from what might have been to what actually was, resulted from the decline in traffic, only a small proportion—probably not more than $100,000,000—being due to the rate readjustments, many of which were not in effect for the whole of the year.

This $1,300,000,000 strikingly represents the cost to the railways of a poor, as compared with a good, traffic year. It furnishes also a dim idea of what the country at large loses—potentially, of course—in a period of business depression. If the railways lose $1,300,000,000 in revenues, how many times greater are the losses of the farmers, the manufacturers, and other producers of consumption goods?

Table II gives the comparative statistics for 1921 and 1920 of the several classes of railway revenue, freight, passenger, etc., the entries for 1921 being partially estimated.

TABLE II

	1921 (millions)	1920 (millions)
Freight revenue	$3,940	$4,325
Passenger revenue	1,185	1,289
Mail revenue	95	150
Express revenue	105	143
All other revenue	300	318
Total	$5,625	$6,225

It will be seen that freight revenues declined $385,000,000, or 9 per cent. Passenger revenue fell off $104,000,000, or about 8 per cent. The decline of $55,000,000 in mail revenue is more than accounted for by the fact that that revenue in 1920 was inflated by approximately $60,000,000 of back mail pay, actually earned in earlier years but not taken into the accounts until 1920. Deducting this inflation in 1920, the mail revenue for 1921 was slightly greater than for 1920, indicating an increase in the amount of mail handled for the government. Incidentally, it was the only revenue item to show an increase in 1921.

Express revenue declined $38,000,000, or about 26 per cent, whereas "all other" revenue fell off $18,000,000.

Operating Expenses

Operating expenses in 1921 amounted to $4,650,000,000. This was a reduction of $1,176,000,000, or 20 per cent, below the expenses of 1920. They were greater than in 1919 by $231,000,000, and like the revenues were the greatest on record save only for the year 1920.

Table III shows how the operating expenses of 1921 and 1920 were distributed as between the general classes of expense. The entries for 1921 are, of course, subject to revision.

TABLE III

	1921 (millions)	1920 (millions)
Maintenance of way	$780	$1,034
Maintenance of equipment	1,280	1,584
Traffic	85	74
Transportation	2,300	2,907
General	165	171
All other expenses	40	56
Total	$4,650	$5,826

The expense of maintaining way and structures was reduced by $254,000,000 in 1921, or 25 per cent. Maintenance of equipment expenses were cut $304,000,000, or 19

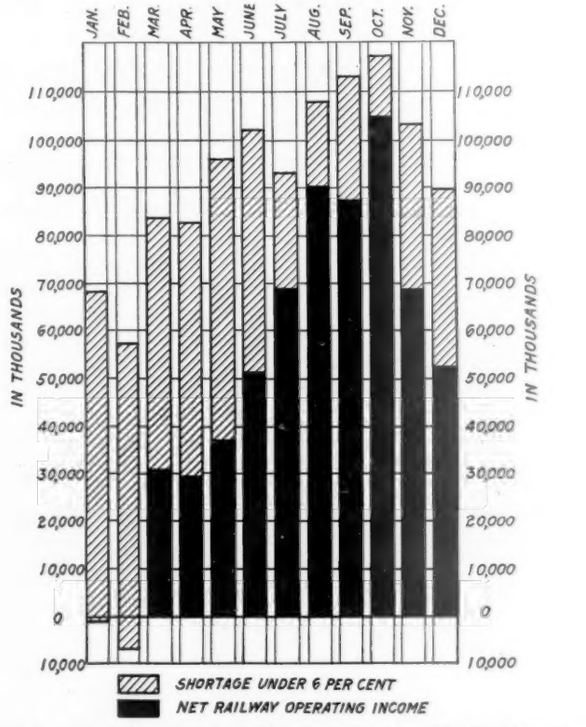


Chart A—Net Railway Operating Income in 1921, By Months, Compared With Six Per Cent On Valuation

per cent. The total maintenance cost—roadway and equipment—was reduced from $2,618,000,000 in 1920 to $2,060,000,000 in 1921, a decrease of $558,000,000 or 21 per cent.

Transportation expenses, the cost of operating trains and carrying on the activities collateral thereto, were reduced $607,000,000, or 21 per cent. General and "all other" expenses showed declines, while traffic expenses increased $11,000,000.

Net Operating Income

The first important stopping place in the railway income account is net operating income. This is what is left of revenues after operating expenses have been met, taxes have been paid, and the net balances of equipment and joint facility rentals have been settled. Net operating income is the gage by which the success of railway operation, speaking financially, must be measured. If in amount it proves insufficient to cover fixed charges, necessary reserves, and a margin for moderate dividends and surplus, railway operation has not been successful, and the credit and financial future of the railways are seriously threatened.

Net operating income formed the basis of the compensation paid the railways by the government during the 26

months of federal control. It was the basis of the guarantee, provided in the Transportation Act for the six months of the guaranty period in 1920. Further, and far more important for the present discussion, the relation of net operating income to railway value determines the rate of return as defined in the Transportation Act, indicates whether or not the railways are earning the 5½ per cent, 6 per cent, or other percentage that may be fixed as a fair and reasonable rate, and finally fixes the point at which the government steps in to share the net earnings of the individual companies, if the rate rises above 6 per cent. Net operating income is, therefore, the most important item in the income account, and the showing it makes is eagerly watched from month to month, and from year to year.

The net operating income of 1921 is estimated at $616,-

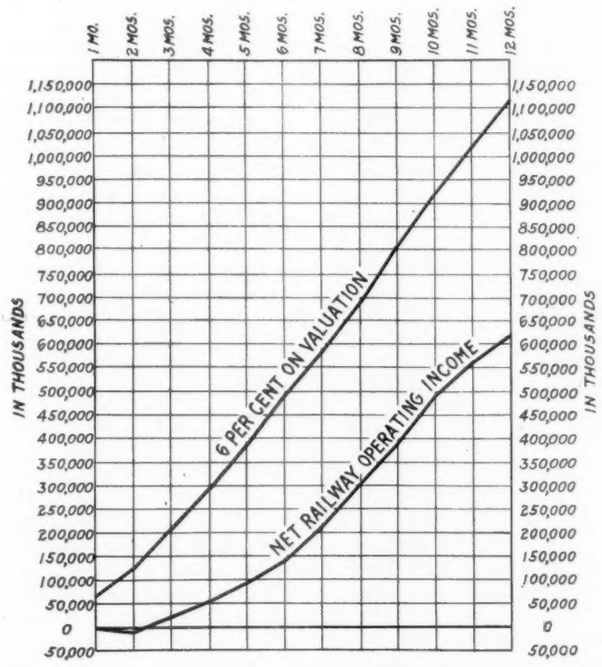


Chart B—Cumulative Net Railway Operating Income in 1921, Compared With Six Per Cent Valuation

000,000, or almost exactly 10 times what it was in 1920. It was greater in 1921, too, than in the second year of the federal control period, namely, 1919. It was smaller in amount, however, than in any year of private operation prior to 1918 back to the fiscal year 1908. In other words, net operating income was smaller in 1921 than in 13 years, not counting the period when the government was either operating the railways or guaranteeing their net income. During this period of government operation or guaranty, little effort was made to adjust the revenues to the expenses by raising rates sufficiently to meet the increase in operating costs, and to the railway corporations it was of no immediate concern whether the policy was to keep revenues even with expenses or not, as they were held safe against loss by the government guarantee. For the years preceding 1918, however, and again in 1921, it was a matter of very grave concern to the railways whether their net operating income was adequate or not, for inadequacy spelled financial stress and continued inadequacy meant impending disaster.

With this point in mind, let us see what the results in 1921 really mean. Under the increased rate decision of the Interstate Commerce Commission in 1920, the railways as a whole were expected to earn 6 per cent on their tentative valuation as fixed by the Commission for rate-making purposes. For the year 1921, this 6 per cent was equivalent to $1,116,000,000. The net operating income actually earned was $616,000,000, or $500,000,000 less than the amount anticipated under the rate decision. Instead of earning 6 per cent in 1921, the railways actually earned 3.3 per cent. This was sufficient to meet their interest requirements by a comparatively narrow margin, but was inadequate to meet all their fixed charges (including rentals), leaving nothing for reserves and dividends. Here again the effect of the decline in traffic on railway results stands out as perhaps the most significant element in the railway record of 1921.

The Story by Months

The story by months in 1921 is most interesting. Beginning with operating deficits in January and February, there was a slight improvement, to June, then a considerable improvement from July to October, and finally a recession in November and December. The improvement following the midyear was due partly to an improvement in traffic, and partly to decreased costs of operation, growing out of the wage reduction effected by the Railroad Labor Board on July 1, and also the declining costs of material and supplies. The effect of the drive of the railways for economy and efficiency, combined with a cut in maintenance work and consequent reduction in force and utilization of materials, was also apparent.

Table IV gives the rate of return in 1921, distributed by months. The rate earned in each month is reduced to an annual basis, representing what the annual rate would have been had the net operating income for a period of one year been proportioned to the net operating income of the particular month. In arriving at the proper proportion for each month, due allowance was made for seasonal fluctuations in traffic and earnings; that is, October is expected to earn more than February, and the rate for that month has been computed with an eye to such expectation. The entries for November and December are estimated in part.

TABLE IV

	Rate of return—per cent (Annual basis)
January, 1921	Deficit
February	Deficit
March	2.2
April	2.1
May	2.3
June	3.0
July	4.5
August	5.0
September	4.6
October	5.4
November	4.0
December	3.5
The year	3.3

Charts A and B show these monthly rates of return in graphic form. Chart A consists of upright bars for each month in 1921, the black portion of which represents the net operating income actually earned, and the shaded portion the shortage as compared with six per cent on the tentative valuation. As the results for January and February were net deficits, the shaded portion extends below the zero line. It will be noted that the bars as a whole are of varying length, due to the seasonal fluctuations already referred to.

Chart B shows the same thing cumulatively, the trend from month to month being compared by two lines, the upper one of which indicates six per cent on valuation, while the lower one shows the actual net operating income. The spread between the two lines is, of course, the shortage under six per cent.

Receipts Per Traffic Unit

Interesting comparisons are afforded by the showing of average receipts per ton-mile and per passenger-mile in 1921 and 1920. These are given in Table V, for each month of

1920 and for the months of 1921 to the latest available date.

TABLE V

Month	Average receipts per ton-mile (cents)		Average receipts per passenger-mile (cents)	
	1921	1920	1921	1920
January	1.210	0.969	3.116	2.614
February	1.254	0.985	3.089	2.594
March	1.335	0.986	3.175	2.613
April	1.334	0.981	3.190	2.608
May	1.251	0.954	3.139	2.614
June	1.278	0.970	3.093	2.575
July	1.254	0.960	2.987	2.561
August	1.288	0.936	3.006	2.643
September	1.288	1.154	3.070	2.989
October	....	1.226	....	3.002
November	....	1.263	....	3.019
December	....	1.209	....	3.142

In studying the comparative figures of Table V, it should be noted that a considerable increase in freight and passenger rates became effective toward the close of August, 1920. The effect of such increase was barely discernible in the passenger-mile average for August, 1920, and not at all discernible in the ton-mile average. Not even in September, 1920, did the rate increases seem to have full effect, partly because much traffic was on the rails in that month that had been billed (or passenger tickets purchased, as the case might be) at the lower rates, also because state commissions had not in some cases made effective intrastate rates to correspond to the increased interstate rates. Beginning with October, 1920, however, the effect of the rate increases on the average receipts per ton-mile and passenger-mile, respectively, can be traced from the record shown in Table V. In making comparisons of 1921 with 1920, only corresponding months should be compared, because the seasonal changes in traffic cause the average receipts to vary considerably from month to month. Thus January should be compared with January, February with February, and so on.

Employees and Their Wages

Beginning with 1920, the Interstate Commerce Commission required railways of Class I to file their reports of number and compensation of employees quarterly, instead of annually as theretofore. In these quarterly reports the number of employees at the middle of each month was reported, but compensation for the quarter as a whole. The classification consisted of the 68 groups into which the Commission classified the employees, beginning in 1915.

Although this was a distinct advance in railway labor statistics, the data secured from these quarterly reports did not prove sufficiently detailed and were not available at sufficiently frequent intervals to satisfy either the Interstate Commerce Commission or the Railroad Labor Board, the latter being a new entry in the field of labor statistics. Accordingly, beginning with July, 1921, the Commission and the Labor Board jointly inaugurated a new system of railway labor reports, the principal features of which are a classification into 148 groups—instead of 68—and the requirement that the returns be made monthly instead of quarterly.

At the date of this writing the Commission has made public only two monthly summaries based on the new reports—those for the months of July and August, 1921—although individual returns are wholly or largely in hand for the months of September and October. From preliminary summaries by the Bureau of Railway Economics, however, a fairly accurate picture of labor conditions may be set forth down to and including October.

First, as to the number of employees on the payrolls of the railways of Class I. This has been subjected to such great fluctuations that it is worth while to turn back to 1920 and trace the story down to October, 1921. This is done in Table VI. The entries for September and October, 1921, are based on preliminary tabulations, and are subject to revision. This is especially true of October.

It will be noted from Table VI that railway employees numbered 2,000,105 and 1,970,525, respectively, during January and February, 1920, the final months of federal control. The railways came back to their owners in March with 2,009,948 employees. From April the number gradually rose to a maximum of 2,197,824 in August, 1920, which was the largest number of railway employees ever recorded. At that time it will be recalled, the railways of

TABLE VI

	Number of employees	
	1921	1920
January	1,804,822	2,000,105
February	1,676,543	1,970,525
March	1,593,068	2,009,948
April	1,542,716	1,952,446
May	1,575,599	2,005,483
June	1,586,143	2,056,381
July	1,634,872	2,111,280
August	1,679,927	2,197,824
September	1,721,000	2,164,880
October	1,745,000	2,136,259
November	.....	2,068,454
December	.....	1,976,429

the United States were handling the largest traffic in their history, the traffic of the respective months from August to December being heavier than in any previous corresponding months.

From October, 1920, and more or less paralleling the sharp decline in traffic after the middle of December, the number of railway employees showed a consistent decline to April, 1921, when the lowest point was reached since 1915. After April, when the trend again turned upward, there was a steady, although rather gradual recovery, so that in October of 1921 there were 200,000 more railway employees at work than in April. Even making full allowance for the seasonal difference between April and October, the record shows partial recovery.

The second consideration is wages. Here a clear distinction must be made between wages (used in the sense of rates of pay) and earnings, or compensation. One represents the rate at which a man works, per hour, day, month, or mile, while the other is the total amount of money he earns in a given period, being the result of multiplying the rate of pay into the number of hours, days, months, or miles with which he is credited.

As to the rates of pay, or wages, a general decrease was authorized by the Railroad Labor Board on July 1, 1921, which has been estimated as averaging from 11 to 12 per cent. This cut off about half of the increase granted by the Railroad Labor Board in 1920.

Looking at the average wage throughout 1920 and 1921, the curious fact develops from a mathematical calculation that the average for each year was virtually the same. That is, assuming that a man was on duty the same number of hours in the two years, his total compensation would be virtually the same for each year. This is speaking of the *average* man, and would not hold true of any of the individuals actually at work. For example, assume that a man received $100 a month at the beginning of 1920, and was given the same increase on May 1 of that year as the average for all employees, or 21 per cent. He received $100 a month for four months (January to April) and $121 a month for the remaining eight months, a total for the year of $400 plus $968, or $1,368. In 1921 he received his $121 for six months (January to June), and was then cut 11 per cent to $107.69, which was his rate during the remaining six months. His total for the year 1921 was therefore $726 plus $646.20, or $1,372.20, or within $4.20 of his 1920 earnings.

This is a purely hypothetical case, of course, and the figure of $100 per month with which we started is not offered as typical, but merely as an easy figure to handle mathematically. Furthermore, it was assumed that hours on

duty remained constant throughout the two-year period, whereas the truth is that they declined somewhat in 1921, in sympathy with the decline in traffic.

The bearing of the example is this: If average wage rates were the same in 1921 as in 1920, then any reduction in the total payroll in 1921 must be due chiefly to one or both of two factors, namely, reduction in force or reduction in hours per man, especially the hours of overtime. Investigation of the facts indicates that both forces were at work in 1921.

Let us look first at aggregate compensation in the two years. In 1920 the railways paid their employees more than $3,700,000,000, or more than 2½ times as much as in 1916. There was some increase in force between 1916 and 1920, it is true, but the bulk of the increase in compensation was the result of increased wage rates.

In 1921 the payroll was approximately $2,718,000,000, a reduction of over a billion dollars from the very high level of 1920. The reduction in total payroll was more than 25 per cent, while the reduction in average number of employees was nearly 20 per cent. The average wage rate in the two years being practically the same, as we have seen, the remaining proportion of the reduction in payroll must have been due largely to reduction in overtime and other hours.

The average annual compensation per employee has shown considerable variation during the past two years. In 1919, the final year of federal control, it was $1,486 (annual basis). For the first quarter of 1920 it was $1,596. For the second quarter of 1920, which contained one month under the old and two months under the increased wage rates, the annual average was $1,812. During the final two quarters of 1920 the annual averages were $1,952 and $1,908, respectively. The average of $1,952 for the third quarter represented the peak of earnings for railway employees. The fourth quarter began to show the effect of the decline in traffic, which reduced overtime work and affected the average in other ways as well.

For the year 1920 as a whole, two-thirds of which was under the increased wage scale, the annual average compensation was $1,820. The first quarter of 1921 dropped to $1,792, and to $1,784 for the second quarter. This brings the record to July 1, when the 11 per cent reduction in average wage rates became effective. Complete wage statistics are available only for two months since the reduction, the records for which show an annual average of $1,573 in July and $1,627 in August.

Traffic in 1921

Emphasis has already been laid upon the serious decline in railway traffic in 1921, as compared with 1920. Net ton-miles (revenue and non-revenue ton-miles) broke all records in 1920, being as much as seven billions greater than the previous record year, the strenuous war year of 1918. The total for 1920 was 447 billions. Indications are that for 1921 the corresponding total did not exceed 350 billions, a decline of approximately 100 billions, or 22 per cent.

This is one of the most remarkable traffic declines in American railway history. Every month of the year showed a falling off of from three to twelve billions. The level for the year as a whole is below that for any of the six years next preceding; that is, we must go back to the year 1915 to find a traffic situation that was even approximately as poor as in 1921.

The story by months in 1921, compared with 1920, is presented in Table VII. Entries for the final two months of 1921 are estimated in part.

Revenue passenger-miles had progressively broken the record in every year from 1915 to 1920. In 1921, however, there was a recession of 19 per cent from the 1920 total, bringing the level for the year below that for 1917. In other words, we must go back to 1916 to find a smaller amount of passenger travel than in 1921. The total for 1920 was 46.8 billions, but fell in 1921 to 38.0 billions, every month in the year showing a recession. In fact, the percentage of decrease seemed to grow as the year wore on,

TABLE VII

	Net ton-miles (millions)	
	1921	1920
January	29,824	34,765
February	24,913	32,695
March	26,826	37,991
April	25,579	28,531
May	28,219	37,902
June	28,141	38,158
July	28,412	40,450
August	30,382	42,707
September	30,822	41,000
October	36,507	42,563
November	28,800	37,459
December	31,600	34,722
The year	350,000	447,278

the worst months being July and August, with decreases of 24.0 and 27.4 per cent, respectively, whereas January declined only 4.1 per cent and February 10.0 per cent.

The comparative monthly statistics for 1921, compared with the months of 1920, are shown in Table VIII. The entries for October, November, and December, 1921, are partially estimated.

The reason for these declines in freight and passenger traffic is not far to seek. All business activities in 1921 were in the throes of a revolutionary transition period, the inevitable aftermath of a war so prolonged and so extensive as that waged from 1914 to 1918. The railways create

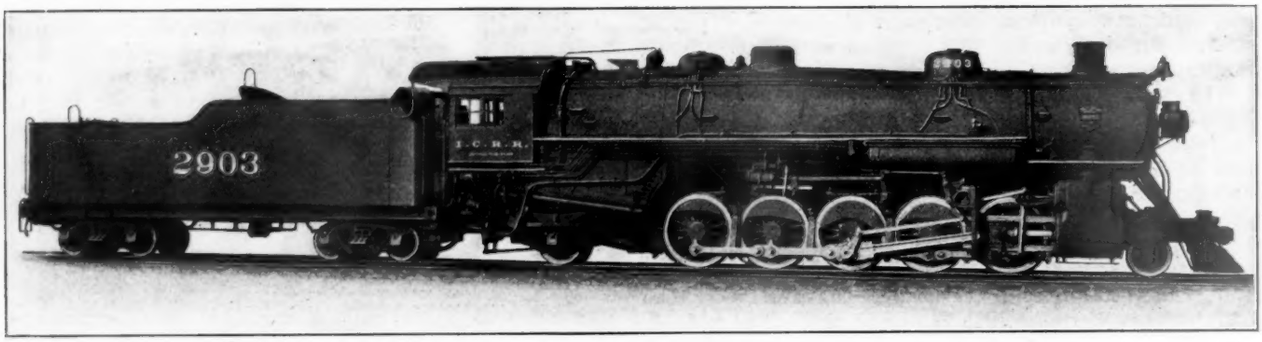
TABLE VIII

	Revenue passenger-miles (millions)	
	1921	1920
January	3,358	3,501
February	2,857	3,174
March	3,056	3,530
April	2,833	3,552
May	2,969	3,761
June	3,215	4,149
July	3,637	4,785
August	3,623	4,988
September	3,291	4,294
October	2,900	3,762
November	2,900	3,518
December	3,300	3,641
The year	38,000	46,848

little traffic of their own; they handle the traffic that is produced for them by the economic activities of the country. As a barometer of business conditions, the level of railway freight traffic is almost unexcelled. When business is good, freight moves in large volume; when it is depressed, freight suffers accordingly. The recession in railway traffic indicates in most significant fashion the extent to which business in general was on the rack in 1921.

It has already been pointed out that the financial results in October showed decided improvement, followed by a slump in November and December. Temporary influences were at work in these last two months, which it is hoped will not long continue in 1922. In the first place, the threatened coal and railway strikes hurried much traffic onto the rails in October which would normally have been spread over one, or even two, succeeding months, with the result that October was above normal and November and December below normal. Second, the knowledge, in November and December, that the transportation tax would be abolished at the end of the year, under the new revenue act, probably held back some traffic and travel in those months that will be released after January 1. Third, and in some respects most important, the uncertainty as to the level of

(*Continued on page* 146)



100 of These Locomotives Were Built by the Lima Locomotive Works for The Illinois Central

Locomotive Market in Quiescent State During 1921

Domestic Orders Make New Low Record—Largest Buyer Is National Railways of Mexico

By Frank W. Kraeger

THE ORDERS placed for locomotives for domestic service in the United States in 1921 totaled, according to the compilations of the *Railway Age*, 239. This compared with 1,998 in 1920. In other words, it was but one-eighth the business of that year. In 1919, the second year of federal control, the locomotives ordered for domestic service in the United States totaled 214; the 1921 figure, poor as it was, luckily succeeded in bettering slightly that ignominious record.

Orders placed by railroads in Canada with Canadian builders totaled 35, as compared with 189 in 1920 and 58 in 1919.

The export locomotive orders for 1921 aggregated 546, inclusive of the orders placed by lines in Mexico. This compared with 718 in 1920 and 898 in 1919. The Mexican lines signalized their rehabilitation and return to normalcy by placing in 1921 the largest order for any system in North America, the National Railways of Mexico having ordered a total of 142 locomotives.

Production in 1921 totaled 1,121 locomotives for domestic service and 587 for export. The 1,121, although it was several times the number of new locomotives ordered during 1921, was the lowest total the American locomotive manufacturers have experienced for many years. It compared with 1,857 (exclusive of Canada) in 1920. One has to go back to 1897 to find a lower figure than the 1921 performance.

TABLE I—LOCOMOTIVE ORDERS OF 1921

For Class I railroads	190
For other American Railroads	20
For domestic industrials	29
Total domestic	239
For service in Canada	35
For export to other countries	546
Grand total	820

With these facts at hand, it must be admitted that 1921 found the locomotive market in a quiescent state. It is true that a fair number of locomotives were sent to the builders for heavy repairs or rebuilding and that this helped the situation to some extent. The reason for the poor business done, insofar as concerns domestic orders, was, of course, the sharp decline in traffic and the weak and anæmic character of the figures of net railway operating income. During a large part of the year the reports showed considerable numbers of serviceable locomotives stored and a high percentage of unserviceable locomotives.

On December 1, according to the A. R. A. Car Service Division reports, there were 5,308 serviceable locomotives stored and 12,170, or 18.8 per cent, held for repairs requiring over 24 hours. At various times during the year the "bad order" locomotives approached 20 per cent. It is an interesting fact that this is a matter which received but small attention during the year. The contrast as between the publicity given the bad order car figure and that given the unserviceable locomotive per cent is especially striking. The reason for the failure to pay attention to the locomotive condition situation is quite evident. In a period when expenses had to be cut to the bone, one would hardly have expected the operating officer to over exert himself about his per cent of unserviceable locomotives while he had a sizable number of serviceable locomotives in white lead. It was hardly to be expected either that a period which was characterized by that sort of thing would be productive of large orders for new locomotives. However, even at that, the 1921 total is rather disappointing. One can find consolation at least in the fact that this condition cannot last. The American railroads have got to make up their deferred motive power requirements some time.

With further reference to the domestic orders, the only

TABLE II—ORDERS FOR LOCOMOTIVES SINCE 1901

Domestic orders only

Year	Locomotives	Year	Locomotives
1901	4,340	1908	1,182
1902	4,665	1909	3,350
1903	3,283	1910	3,787
1904	2,538	1911	2,850
1905	6,265	1912	4,515
1906	5,642	1913	3,467
1907	3,482	1914	1,265

Domestic and Foreign

Year	Domestic	Foreign	Total
1915	1,612	850	2,462
1916	2,910	2,983	5,893
1917	2,704	3,438	6,142

Year	Class I railroads	Other American railroads	Domestic industrials	Total domestic	Canadian	For export	Grand total
1918	2,548	7	38	2,593	209	2,086	4,888
1919	....	....	....	214	58	898	1,170
1920	1,668	103	227	1,998	189	718	2,905

systems which placed contracts of any size—and even their orders were not large—were the Atchison, Topeka & Santa Fe, the Southern Pacific, the Seaboard Air Line, the Central of New Jersey and the Rock Island. All the additional orders were of small size, being only of from one to eight locomotives. In the small total there is noticeable a comparatively large proportion of Santa Fe and Mountain type locomotives, which is what one would naturally expect. Brick arches and superheaters have now been so generally adopted that it is a rare thing for a new locomotive to be built without them. Stokers and power reverse gear also are usually applied to all heavier power and the past year has evidenced a growing tendency to the more extended use of feedwater heaters and boosters.

TABLE III—LOCOMOTIVES BUILT IN 1921

	United States	Canada	Total
Domestic	1,121	64	1,185
Foreign	587	51	638
Total	1,708	115	1,823

Comparison with Previous Years

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	866	309	1,176	1908*	1,886	456	2,342
1897	865	386	1,251	1909*	2,596	291	2,887
1898	1,321	554	1,875	1910*	4,441	314	4,755
1899	1,951	514	2,475	1911*	3,143	387	3,530
1900	2,648	505	3,153	1912†	4,403	512	4,915
1901	....	...	3,384	1913†	4,561	771	5,332
1902	....	...	4,070	1914†	1,962	273	2,235
1903	....	...	5,152	1915†	1,250	835	2,085
1904	....	...	3,441	1916†	2,708	1,367	4,075
1905*	4,896	595	5,491	1917†	2,585	2,861	5,446
1906*	6,232	720	6,952	1918†	3,668	2,807	6,475
1907*	6,564	798	7,362	1919†	2,162	1,110	3,272
				1920†	2,022	1,650	3,672

*Includes Canadian output.
†Includes Canadian output and equipment built in railroad shops.

Foreign Business

The number of locomotives ordered in 1921 for export was small, even if it was double the domestic orders. The largest order, as already noted, was from Mexico—that is, if it is proper to include in the foreign orders, locomotives to be delivered to a road which subscribes to the A. R. A. Code of Interchange Rules, as do the National Railways of Mexico. The other countries which furnish sizable business were Argentina, Chile, China, Brazil and Japan. Much of this business was obtained in spite of the keenest competition, considerable of it from German builders whose quotations were at times below those of the successful American bidder. In such cases the American reputation for prompt deliveries was frequently a deciding factor.

The orders from Argentina were principally from the State Railways. The Japanese business is of interest because Japan has a considerable locomotive production of its own. The Chilean State Railways, which ordered 30 steam locomotives, merit attention because they placed the largest electric locomotive order of the year—35 locomotives for the new electrification out of Santiago.

In looking over the foreign specifications it is evident that the railroads in other countries are appreciating the economic advantages to be obtained from the use of considerably heavier power than that which they have hitherto purchased, although naturally the locomotives are lighter than those used on American roads. It is interesting to note that whereas only one Mallet locomotive was ordered in 1921 by an American railroad, a number were ordered for use in China, these being the heaviest locomotives built for use on any road outside of the United States. The tabulated data indicate that the American locomotive builders did well in China in 1921.

An interesting point in connection with the export trade is the paucity of orders from European countries this year and the absence of Cuba—due to the ill-fortunes of the sugar industry—from the list of purchasers. In the foreign field, as well as in the domestic field, the controlling factor was the difficulty, at times insurmountable, of obtaining either the necessary capital or credit. In a number of instances the locomotive builders were obliged to arrange for the necessary financing.

Production

As previously noted, the number of locomotives built during 1921, as distinguished from orders, was record-breakingly small. The domestic production was the lowest since 1897—the foreign is back to pre-war records.

The locomotive orders which are listed in the accompanying tables are compiled from official sources. Some few omissions of small unimportant orders doubtless occur. The data presented were supplied by the railways and the industrial companies in response to inquiries from the *Railway Age*. They were checked against similar lists furnished through the co-operation of the builders and with the weekly reports in the Equipment and Supplies column of the *Railway Age*.

Locomotive Orders in 1921

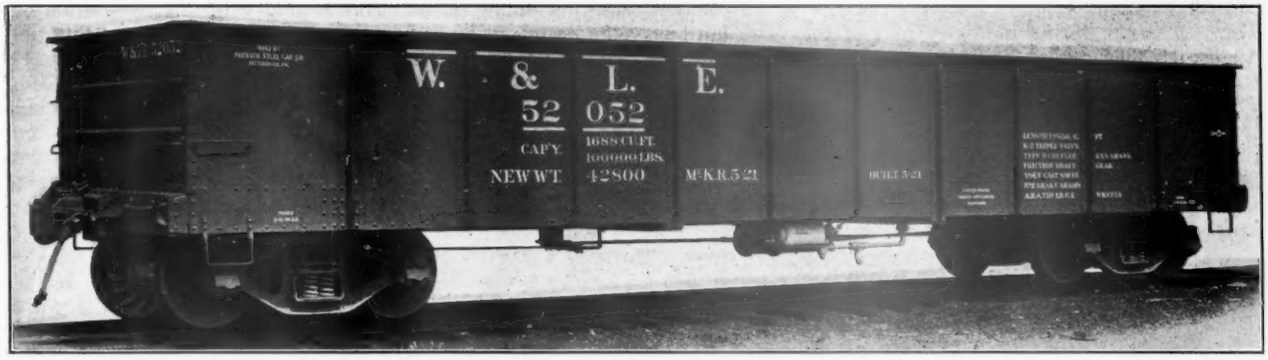
Class I Roads

Purchaser	No.	Type	Service	Weight	Cylinders	Mechanical stoker	Builder
Atchison, Topeka & Santa Fe	15	2-8-2	Freight	315,300	27 x 32	No	Baldwin
	10	2-10-2	Freight	378,000	30 x 32	No	Baldwin
	8	4-8-2	Passenger	354,000	28 x 28	Yes	Baldwin
	7	4-8-2	Passenger	340,000	28 x 28	No	Baldwin
	10	4-6-2	Passenger	298,500	25 x 28	No	Baldwin
Atlantic Coast Line	1	4-6-0	Passenger	206,000	23 x 26	No	Baldwin
Brooklyn Eastern Dist. Term	1	0-6-0	Switching	125,000	19 x 24	No	Baldwin
Central of New Jersey	25	2-8-2	Freight	337,000	27 x 32	Yes	American
Chicago, Rock Island & Pacific	14	2-8-2	Freight	333,100	28 x 20	No	American
Green Bay & Western	2	2-6-0	Freight	.....	.....	....	American
International & Great Northern	4	2-8-2	Switching	274,900	25 x 30	Yes	Baldwin
	4	0-6-0	.....	147,840	21 x 26	Yes	Baldwin
Mississippi Central	4	2-8-2	Freight	177,000	20 x 28	No	American
Pittsburgh & West Virginia	2	4-6-2	.....	.....	.....	....	American
Seaboard Air Line	10	4-8-2	.....	315,000	27 x 28	....	American
	15	2-8-2	.....	284,000	27 x 30	....	American
Southern Pacific	50	2-10-2	Freight	394,100	29½ x 32	No	Baldwin
Toledo, St. Louis & Western	5	2-8-0	Freight	200,400	22 x 28	No	Lima
Union Pacific	1	4-8-2	.....	350,000	29 x 28	....	American
Virginian	1	2-8-8-0	Freight	505,000	28 & 44 x 32	Yes	Baldwin
	1	2-8-2	Freight	298,000	26 x 32	Yes	Baldwin

Other United States Railroads

Ala., Tenn. & Northern	2	2-8-0	Freight	158,400	20 x 24	....	Lima
California Western R.R. & Nav. Co	1	2-6-2	Pass. & Freight	140,000	18 x 24	No	Baldwin
Campbell's Creek	1	2-8-0	.....	154,000	20 x 24	No	Baldwin
Cumberland & Manchester	2	2-8-0	.....	.....	.....	....	American
	1	....	Passenger	.....	.....	....	Baldwin
Dayton-Goose Creek	1	4-4-0	Passenger	89,000	15 x 24	No	Baldwin
Greenbrier & Eastern	1	2-8-2	Freight	241,000	23 x 28	No	Baldwin
Hunt. & Broad Top Mt	2	4-6-0	Passenger	175,000	21 x 26	No	Baldwin
La Crosse & Southeastern	1	4-6-0	.....	.....	.....	....	American
Laurinburg & Southern	1	4-6-0	Pass. & Freight	126,500	18 x 26	No	Baldwin

Purchaser	No.	Type	Service	Weight	Cylinders	Mechanical stoker	Builder
Mt. Tamalpais & Muir Woods	1	Geared	.....	72,000	.....	....	Heisler
San Antonio Southern	1	2-8-0	Freight	132,000	20 x 24	No	Baldwin
Sewell Valley	1	2-8-2	.....	.....	.....	....	Lima
Sierra Ry. of California	1	2-8-0	Freight	142,000	19 x 26	No	Baldwin
Wabash, Chester & Western	1	2-6-0	Freight	126,500	19 x 26	No	Baldwin
West Virginia Midland	1	0-6-0	Switch	79,400	13 x 18	No	Porter
Yosemite Valley	1	2-6-0	Freight	143,000	19 x 28	....	Baldwin
Industrials							
Alabama Power Co.	1	0-4-0	.....	.....	.....	....	American
	1	2-6-2	.....	.....	.....	....	American
American Bridge Co.	1	0-6-0	Switching	110,500	17 x 24	No	Baldwin
American Sugar Ref. Co.	1	0-4-0	Switching	94,400	16 x 24	No	Baldwin
Brownell Improvement Co.	1	0-6-0	Switching	152,100	22 x 26	No	Baldwin
California Bldg. & Mat. Co.	1	0-4-0	.....	.....	.....	....	American
Dolbeer & Carson Lbr. Co.	1	2-6-2	Logging	124,000	17 x 24	No	Baldwin
Farrell, H. T.	1	2-6-0	Switching	109,800	18 x 24	No	Baldwin
Fleischmann Trans. Co.	1	0-4-0	.....	.....	.....	....	American
Foster Creek Lbr. Co.	1	Geared	.....	170,000	.....	....	Heisler
Fruit Growers' Supply Co.	1	2-6-2	Logging	122,500	17 x 24	No	Baldwin
Gayoso Lbr. Co.	1	Geared	.....	72,000	.....	....	Heisler
Harris-Lipsitz Lbr. Co.	1	2-6-2	Logging	96,400	15 x 24	No	Baldwin
Hunt, John A., Co.	1	2-6-0	Freight	112,500	18 x 24	No	Baldwin
Hutchinson Lbr. Co.	1	Shay	.....	.....	.....	....	Lima
Koppers Co.	1	0-6-0	.....	.....	.....	....	American
Laurentide Co., Ltd.	1	2-6-2	.....	.....	.....	....	Montreal
Mexican Petroleum Co. of La.	1	0-4-0	Switch	79,000	14 x 22	No	American
W. G. Mitchell Lbr. Co.	1	2-6-2	Logging	90,600	15 x 20	No	Baldwin
Oregon Lbr. Co.	1	Geared	.....	94,000	.....	....	Heisler
Parklap Construction Co.	2	0-4-0	.....	.....	.....	....	American
	1	0-4-0	.....	.....	.....	....	American
Peoples Mutual Gas Co.	1	2-8-0	Freight	159,400	21 x 26	No	Baldwin
Pittsburgh Plate Glass Co.	1	0-4-0	.....	.....	.....	....	American
Smith, W. T., Lumber Co.	1	Geared	.....	126,000	.....	....	Heisler
Trumbull Cliff Furnace Co.	2	0-6-0	.....	.....	.....	....	American
Young, J. S., Co.	1	0-4-0	.....	.....	.....	....	American
Railroads and Other Companies in Canada							
Canadian National	12	2-8-2	Freight	282,000	27 x 30	....	Canadian
Canadian Pacific	6	....	.....	.....	.....	....	Company shops
Dept. of Rys. & Canals (Can.)	4	0-4-0	.....	.....	.....	....	Montreal
Grand Trunk	5	0-6-0	Switch	174,000	22 x 26	No	Company shops
Temiskaming & Northern Ont.	4	2-8-2	Freight	261,800	25 x 30	No	Canadian
	4	4-6-2	Passenger	250,000	23 x 28	No	Canadian
Mexico							
Mexican Ry.	11	2-8-0	.....	.....	.....	....	Baldwin
Monterey Iron & Steel Co. (Mex.)	4	2-8-0	.....	.....	.....	....	American
National Railways of Mexico	5	2-8-2	Freight	232,000	30½ x 37½	Yes	Baldwin
	20	4-6-2	Freight	256,000	25 x 28	Yes	Baldwin
	30	2-8-2	Freight	270,000	25 x 30	Yes	Baldwin
	40	2-8-0	Freight	166,000	21 x 28	Yes	Baldwin
	20	2-8-0	Freight	95,000	16 x 20	Yes	Baldwin
	1	2-8-0	Freight	82,000	16 x 20	Yes	American
	1	2-6-0	Freight	71,000	15 x 20	Yes	American
National Railways of Mexico	20	2-8-0	.....	314,000	.....	....	American
	7	2-8-2		440,000	.....	....	American
Texas-Mexican	2	4-6-0	Freight	156,500	20 x 26	No	Baldwin
	1	0-6-0	Switch	142,000	21 x 26	No	Baldwin
Orders for Export							
Alexander & Baldwin (P. I.)	4	2-6-0	.....	.....	.....	....	American
Argentine State Rys.	50	4-8-2	.....	170,000	19 x 24	....	Baldwin
	25	4-6-2	.....	173,000	20 x 28	....	Baldwin
Bahia Rys. (Brazil)	12	....	.....	.....	.....	....	Baldwin
Canton-Hankow (China)	2	2-8-0	.....	.....	.....	....	American
Cerveceria Cuauhtemoc (Mex.)	2	2-8-0	.....	138,000	19 x 26	....	American
	1	2-8-0	.....	.....	.....	....	American
Chilean State Railways	6	Electric	Express	230,000	.....	....	Westinghouse
	15	Electric	Freight	205,000	.....	....	Westinghouse
	11	Electric	Passenger	145,000	.....	....	Westinghouse
	7	Electric	Switcher	118,000	.....	....	Westinghouse
Chilean State Railways	10	2-8-2	.....	.....	.....	....	Baldwin
	20	2-8-2	.....	.....	.....	....	American
Cia Mnfrera Cemento Portland (Mex.)	1	2-8-0	.....	.....	.....	....	American
Cia Mex. de Combustibles	4	2-8-0	.....	.....	.....	....	Baldwin
Colombian Northern	1	2-8-2	.....	.....	.....	....	American
	2	2-6-0	.....	.....	.....	....	Baldwin
East Brazil Federal Rys.	3	4-6-2	.....	.....	.....	....	Baldwin
	4	2-8-0	.....	.....	.....	....	Baldwin
Great Western of Brazil	4	4-6-0	.....	.....	.....	....	Baldwin
Hawaii Consolidated Ry.	1	4-6-0	.....	.....	.....	....	Baldwin
Hokkaido Kogyo Tetsudo (Japan)	1	2-6-2	.....	.....	.....	....	Baldwin
Imp. Karafuto Gov't (Japan)	5	2-6-0	.....	.....	.....	....	American
Imperial Rys. of Japan	2	Electric	Freight & Pass.	109,000	.....	....	Westinghouse
Japanese Imperial Government	2	Electric	.....	132,000	.....	....	General Electric
Pekin-Kalgan (China)	10	4-6-2	.....	.....	.....	....	American
	25	2-8-2	.....	.....	.....	....	American
	7	2-8-8-2	.....	.....	.....	....	American
	2	2-8-2	.....	.....	.....	....	American
	3	4-6-2	.....	.....	.....	....	American
Pekin-Mukden (China)	5	4-6-2	.....	.....	.....	....	Baldwin
Peking-Hankow (China)	30	2-6-2	.....	.....	.....	....	Baldwin
Santo Ry. (China)	6	2-8-0	.....	.....	.....	....	Baldwin
Seisen-Shokusan (Chosen)	1	0-6-0	.....	.....	.....	....	Baldwin
Shantung Railway (China)	3	4-6-2	.....	.....	.....	....	American
	1	4-6-2	.....	.....	.....	....	American
Sorocabana Railway (Brazil)	2	2-8-2	.....	.....	.....	....	Baldwin
South African Gov't. Rys.	13	4-8-2	.....	.....	.....	....	Montreal
Southern Ry. (Colombia)	2	2-6-6-2	.....	.....	.....	....	Baldwin
Trinidad Gov't.	6	4-6-0	.....	.....	.....	....	Montreal
United Fruit Co. (for Honduras)	2	Forney	.....	.....	.....	....	Porter
United States of Colombia	4	....	.....	.....	.....	....	Baldwin
Wonham, Bates & Goode	1	Geared	.....	48,000	.....	....	Heisler
	2	Geared	.....	64,000	.....	....	Heisler
Railways in Argentine	12	....	.....	.....	.....	....	Baldwin
Railways in Brazil	5	....	.....	.....	.....	....	Baldwin
Railways in Colombia	3	....	.....	.....	.....	....	Baldwin
Railways in Cuba	2	....	.....	.....	.....	....	Baldwin
Railways in Hawaii	1	....	.....	.....	.....	....	Baldwin
Railways in Japan	24	....	.....	.....	.....	....	Baldwin
Railways in Java	3	....	.....	.....	.....	....	Baldwin
Railways in Peru	5	....	.....	.....	.....	....	Baldwin
Railways in Philippine Islands	2	....	.....	.....	.....	....	Baldwin
Railways in Salvador	3	....	.....	.....	.....	....	Baldwin
Railways in Santo Domingo	2	....	.....	.....	.....	....	Baldwin



Built by the Pressed Steel Car Co. for the Wheeling & Lake Erie

Freight Car Orders During 1921 Lowest on Record

Attributed to Small Net Income, Decreased Traffic, Large Car Surplus and Bad Order Situation

By Frank W. Kraeger

FREIGHT CARS ordered for domestic service in the United States during 1921 totaled 23,346, the lowest except 1919. The orders compared with 84,207 in 1920; in other words, they were one-fourth the 1920 totals. During the second year of federal control, 1919, practically the only orders placed in North America were those for private car lines and industrials; the total including Canada was 25,899 cars; the 1921 figure succeeded in lowering that unenviable record.

Export orders in 1921 totaled 4,982; this is half the total for 1920, in excess of the figure for 1919, but less than one-tenth the averages for the years 1917 and 1918.

The number of freight cars ordered in 1920 was not large. It did, however, permit the car builders to start 1921 with a fair amount of uncompleted business on their books. The 1921 orders were so few that the year was primarily spent in cleaning up the hold-over 1920 business. The result was minimum production—the totals for the year reaching 40,292 cars built for domestic service and 6,412 for export. For all the fact that the production for freight cars for the past several years has been at a low average, the 1921 total

TABLE I—FREIGHT CAR ORDERS OF 1921

For Class I railroads	21,003
For other American railroads	923
For private car lines and industrials	1,420
Total domestic	23,346
For service in Canada	30
For export to other countries	4,982
Grand total	28,358

succeeded in being less than that for any other year for an indefinite period. Fortunately, there was a reasonable amount of work in the form of freight car repairs to alleviate the situation; but it can hardly be said that repair business went very far in that direction.

The reason for the small quantity of new orders for domestic service in 1921 is due to several factors—the abbreviated net railway operating income; the decreased net ton-miles; the large proportion of idle cars; and the percentage of bad order cars. These factors were more or less interrelated. In a poor year of rather more ordinary poorness, the existence of any one of them could have been blamed for acting as a drag on freight car business. The combination of them in 1921 succeeded in making 1921 a record-breaker of the wrong sort.

It is hardly necessary to discuss the factor of net railway operating income inasmuch as it is receiving considerable attention in various other articles in this issue.

Concerning net ton-miles, attention is directed to the article entitled, "Five Years of Freight Traffic Growth Is Lost," wherein appears a chart showing net ton-miles on the Class I carriers by months from 1916 to October, 1921. The point plotted for 1921 in nearly every month is the lowest for that month. Large orders for new freight cars are naturally not to be expected under such conditions.

TABLE II—ORDERS FOR FREIGHT CARS SINCE 1901

Domestic orders

Year	Freight cars	Year	Freight cars
1901	193,439	1908	62,669
1902	195,248	1909	189,360
1903	108,936	1910	141,024
1904	136,561	1911	133,117
1905	341,315	1912	234,758
1906	310,315	1913	146,732
1907	151,711	1914	80,264

Domestic and foreign

Year	Domestic	Foreign	Total
1915	109,792	18,222	128,014
1916	170,054	35,314	205,368
1917	79,367	53,191	132,558

Year	Class I railroads	Other American railroads	Private car lines and industrials	Total domestic	Canadian	For export	Grand total
1918	101,063	904	12,146	114,113	9,657	53,547	177,317
1919	.....	.....	.....	22,062	3,837	3,994	29,893
1920	51,250	1,044	31,913	84,207	12,406	9,056	105,669

The net freight car surplus varied during the year between 68,984 on October 31 to 507,274 on April 8. On December 15 it was 371,044. The year 1921 is the only year on record in which idle cars climbed over the 500,000 mark. The years during which at any time the surplus has gone over even 300,000 are very few. They include 1908, when the highest figure was 413,338; possibly 1914, during a portion of which the total got so large that the compilation of figures was abandoned; in 1915, when 327,084 was reported; and in 1919, when the peak was reached of 448,864.

Large car surpluses and declining totals of net ton-miles are not unusual. Such a large percentage of bad order cars, however, was a feature more or less singular to 1921. The

bad order cars on January 1 totaled 191,234, or 8.5 per cent. They increased during the early part of the year, until on August 15 they totaled 382,440, or 16.6 per cent. On December 1 this had been reduced to 320,292, or 14 per cent. This is not the place to discuss the reasons for the high bad order totals—it is the place, however, to indicate that the effect on new freight car business was potent, to say the least. A railroad worrying each month whether its net railway operating income would be shown in black or in red figures could hardly be expected to buy new cars at high, even if not at peak prices, while it had large numbers of both unserviceable and idle serviceable cars. There was, of course, a fair amount of repair business but, as noted, not exactly a large amount of it.

Fortunately, the gradually declining percentage of bad order cars indicates an improvement in the situation. In fact, all four of the factors which we blamed for the disappointing 1921 business are, looking at it in the larger way, showing improvement. This is said with due recognition of the decreased business which is a natural factor at this time of the year.

Sizable orders were reported in 1921 by but few roads. The Atchison, Topeka & Santa Fe ordered 1,300 gondola and 2,500 refrigerator cars. The Baltimore & Ohio contracted for 3,000 hopper and box car bodies to be used for replacements. The Chicago, Milwaukee & St. Paul placed orders for 2,500 gondola cars. The Lackawanna reported 1,500 hopper and 500 box cars. The Illinois Central secured 1,000 refrigerator cars. Other large orders are reported for the Louisville & Nashville, 2,800 cars, and the Minneapolis, St. Paul & Sault St. Marie, 1,300. The absence of the New York Central and Pennsylvania from the lists is noticeable; these roads, however, received large allocations of U. S. R. A. standard equipment, and the former also placed large orders in 1920.

Another interesting but disappointing factor was the small amount of orders for private car lines and industrials. Canadian orders were likewise conspicuous by their absence.

The export orders for the year were not large. Such business, however, has apparently been brought to a more stable basis than was the case when the larger part of the business was placed by European countries which had car-building plants of their own but which were used for other purposes during the war. The Argentine State Railways purchased 2,000 cars; the Chilean State Railways, 320; China also purchased a fairly large number. The order given a Canadian company for 500 tank cars for the Russian Soviet Government merits more than passing attention. The Chinese orders and those from South America—in the latter case from the state owned railways—prove the contentions made in the recent past that it was among such purchasers that our foreign business was most likely to be found.

The list of orders which follows is compiled from information furnished the *Railway Age* by railroads, private car lines and car manufacturers. It was checked and amplified by comparison with the items appearing each week in the Equipment and Supplies column of the *Railway Age*. The railways, private car lines and manufacturers gave us their usual co-operation not only as to new orders but as to production and it is with pleasure that the editors of the *Railway Age* draw the reader's attention to that fact. The *Railway Age* is especially indebted to Dr. W. F. M. Goss, president of the Railway Car Manufacturers Association, for the courteous and valuable assistance given us in securing the reports from the members of that association.

TABLE III—FREIGHT CARS BUILT IN 1921

	United States	Canada	Total
Domestic	40,292	8,404	48,696
Foreign	6,412	745	7,157
	46,704	9,149	55,853

Comparison with Previous Years

	Freight		
Year	Domestic	Foreign	Total
1899	117,982	1,904	119,886
1900	113,070	2,561	115,631
1901	132,591	4,359	136,950
1902	161,747	2,800	162,599
1903	153,195	1,613	152,801
1904	60,955	1,995	60,806
1905*	162,701	5,305	165,155
1906*	236,451	7,219	240,503
1907*	280,216	9,429	284,188
1908*	75,344	1,211	76,555
1909*	91,077	2,493	93,570
1910*	176,374	4,571	180,945
1911*	68,961	3,200	72,161
1912†	148,357	4,072	152,429

*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand
	Domestic	Foreign	Total	Domestic	Foreign	Total	Total
1913	176,049	9,618	185,667	22,017	.....	22,017	207,684
1914	97,626	462	98,088	6,453	.....	6,453	104,451
1915	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916	111,516	17,905	129,421	.....	.....	5,580	135,001
1917	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918	67,063	40,981	108,044	14,704	1,960	16,664	124,708
1919	94,981	61,783	156,764	6,391	30	6,421	163,185
1920	60,955	14,480	75,435	.....	.....	.....	.....

Freight Car Orders in 1921

Class I Roads

Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft gear	Trucks	Builder
Atchison, Topeka & Santa Fe...	300	Gondola	100,000	46 ft. 0 in.	Steel Frame	46,500	Friction	St. Side Fr.	Haskell & Barker
	1,000	Gondola	100,000	40 ft. 0 in.	Steel Frame	47,000	Friction	St. Side Fr.	Am. Car & Fdy.
	1,250	Refrig.	70,000	33 ft. 2 in.	St. Und'frame	55,300	Friction	St. Side Fr.	Haskell & Barker
	1,250	Refrig.	70,000	33 ft. 2 in.	St. Und'frame	55,300	Friction	St. Side Fr.	Am. Car & Fdy.
Atlanta & West Point.....	6	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Atlantic Coast Line.....	30	Caboose	.....	29 ft. 8 in.	St. Und'frame	43,000	Friction	Arch Bar	Company Shops
Baltimore & Ohio.....	500	Box Bods.	80,000	40 ft. 4 in.	St. Und'frame	45,000	.....	.....	Standard Steel
	500	Box Bods.	80,000	40 ft. 4 in.	St. Und'frame	45,000	.....	.....	Am. Car & Fdy.
	500	Hop. Bods.	100,000	30 ft. 0 in.	Steel	40,000	.....	.....	Standard Steel
	500	Hop. Bods.	100,000	30 ft. 0 in.	Steel	40,000	.....	.....	Cambria
	500	Hop. Bods.	100,000	30 ft. 0 in.	Steel	.....	.....	.....	Standard Steel
	500	Hop. Bods.	100,000	30 ft. 0 in.	Steel	.....	.....	.....	Pressed Steel
Bangor & Aroostook.....	200	Box	80,000	37 ft. 7 in.	Steel Frame	40,000	Friction	St. Side Fr.	Standard Steel
	30	Ballast	100,000	40 ft. 0 in.	Steel Frame	.....	Friction	.....	Am. Car & Fdy.
Central of New Jersey.....	75	Hopper	110,000	32 ft. 0 in.	All Steel	41,400	Spring	St. Side Fr.	Standard Steel
	50	Box	80,000	40 ft. 0 in.	St. Und'frame	41,200	Spring	St. Side Fr.	Standard Steel
	1	Box	100,000	40 ft. 6 in.	St. Und'frame	46,000	Spring	St. Side Fr.	Standard Steel
	1	Box	100,000	40 ft. 6 in.	St. Und'frame	46,000	Spring	St. Side Fr.	Standard Steel
	37	Refr.	80,000	36 ft. 0 in.	St. Und'frame	46,500	Spring	St. Side Fr.	Standard Steel
	50	Gondola	100,000	40 ft. 0 in.	St. Und'frame	43,900	Spring	St. Side Fr.	Standard Steel
	6	.....	.....	.....	.....	.....	.....	.....	Company Shops
Chesapeake & Ohio.....	1	Box	100,000	40 ft. 6 in.	Steel Frame	45,200	Friction	.....	St. Louis
Chic., Indianapolis & Louisville.	100	Gondola	100,000	41 ft. 6 in.	Steel	.....	.....	.....	Haskell & Barker
Chic., Milwaukee & St. Paul...	1,500	Gondola	100,000	40 ft. 10 in.	Steel Frame	.....	Friction	.....	Haskell & Barker
	1,000	Gondola	100,000	40 ft. 0 in.	Steel Frame	.....	Friction	.....	Bettendorf
Chic., Rock Island & Pacific...	200	Gondola	100,000	40 ft. 0 in.	Steel Frame	44,000	Friction	.....	General American
Chic., St. Paul, Minn. & Omaha.	125	Stock	80,000	36 ft. 6 in.	St. Und'frame	40,400	Friction	St. Side Fr.	General American
Del., Lackawanna & Western..	500	Hopper	100,000	33 ft. 3 in.	Steel	42,500	Friction	St. Side Fr.	Cambria
	500	Hopper	100,000	33 ft. 3 in.	Steel	42,500	Friction	St. Side Fr.	Standard Steel
	500	Hopper	100,000	33 ft. 3 in.	Steel	42,500	Friction	St. Side Fr.	Am. Car & Fdy.
	500	Box	80,000	36 ft. 5 in.	St. Und'frame	41,000	Friction	St. Side Fr.	Am. Car & Fdy.
	40	Caboose	30,000	.....	Steel Frame	43,300	Friction	.....	Mt. Vernon

Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft gear	Trucks	Builder
Grand Trunk	699	Auto	80,000	40 ft. 6 in.	Steel frame	46,000	Friction	Arch Bar	Am. Car & Fdy.
Georgia	2	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
	4	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Great Northern	500	Refrig.	60,000	39 ft. 2 in.	Wood	53,800	.....	St. Side Fr.	General American
Gulf, Mobile & Northern	50	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Illinois Central	650	Refr.	60,000	40 ft. 0 in.	St. Und'frame	58,400	Friction	St. Side Fr.	Haskell & Barker
	350	Refr.	60,000	40 ft. 0 in.	St. Und'frame	58,400	Friction	St. Side Fr.	General American
	200	Flat	100,000	40 ft. 0 in.	St. Und'frame	34,400	Friction	.....	Bettendorf
	25	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Indiana Harbor Belt	6	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Louisiana & Arkansas	25	Hart Conv.	100,000	42 ft. 0 in.	Steel Frame	.....	Friction	.....	Am. Car & Fdy.
Louisville & Nashville	1,500	Box	80,000	36 ft. 0 in.	St. Und'frame	.....	Friction	.....	Am. Car & Fdy.
	100	Stock	80,000	38 ft. 0 in.	St. Und'frame	.....	Friction	.....	Am. Car & Fdy.
	500	Box	80,000	36 ft. 0 in.	St. Und'frame	43,500	Friction	.....	Mt. Vernon
	300	Coke	80,000	.....	.....	.....	.....	.....	Chickasaw Ship
	300	Gondola	110,000	.....	.....	.....	.....	.....	Chickasaw Ship
	100	Caboose	.....	.....	.....	.....	.....	.....	Company Shops
Minn., St. Paul & S. Ste. Marie	650	Box	80,000	40 ft. 0 in.	St. Und'frame	41,300	.....	.....	Haskell & Barker
	400	Stock	80,000	39 ft. 1 in.	St. Und'frame	38,900	.....	.....	Haskell & Barker
	250	Refr.	60,000	36 ft. 0 in.	St. Und'frame	54,400	.....	.....	Haskell & Barker
Missouri, Kansas & Texas	25	Caboose	60,000	28 ft. 1 in.	St. Center Sills	36,000	Spring	Arch Bar	Company Shops
	9	Box	60,000	36 ft. 0 in.	St. Und'frame	37,700	Friction	St. Side Fr.	Company Shops
	1	Scale Test	60,000	18 ft. 2 in.	Steel	.....	Spring	Arch Bar	Company Shops
Mo., Kan. & Tex. of Texas	1	Caboose	60,000	28 ft. 1 in.	St. Cent. Sills	36,000	Spring	Arch Bar	Company Shops
N. Y., Chicago & St. Louis	6	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Pere Marquette	500	Box	80,000	40 ft. 6 in.	St. Und'frame	44,600	Friction	St. Side Fr.	Pressed Steel
Pittsburgh & West Virginia	300	Hop. Bods.	110,000	.....	.....	.....	.....	.....	Cambria
St. Louis Southwestern	322	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Southern Pacific	200	Box	80,000	.....	.....	.....	.....	.....	Company Shops
Toledo & Ohio Central	1	Caboose	.....	.....	Wood	.....	.....	.....	Company Shops
Western Pacific	700	Gondola	140,000	46 ft. 3 in.	Steel	58,000	.....	.....	Pressed Steel
	25	Dump	100,000	32 ft. 2 in.	Steel	57,000	Friction	.....	Clark Car
Wabash	6	Box	80,000	40 ft. 6 in.	St. Und'frame	45,400	Friction	St. Side Fr.	Am. Car & Fdy.
Other United States Railroads									
Abilene & Southern	2	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Alabama, Tenn. & Northern	250	Gondola	100,000	40 ft. 8 in.	St. Und'frame	36,700	Friction	Arch Bar	Mt. Vernon
	50	Flat	100,000	41 ft. 0 in.	St. Und'frame	.....	Friction	Arch Bar	Mt. Vernon
Buffalo Creek & Gauley	10	Flat	40,000	.....	.....	.....	.....	.....	Koppel
Col. Western R. R. & Nav.	50	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Duluth & Northeastern	24	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Cumberland & Pennsylvania	90	Hopper	110,000	30 ft. 6 in.	Steel	42,300	Friction	St. Side Fr.	Pressed Steel
Gulf & Sabine River	1	.....	.....	.....	.....	.....	.....	.....	Company Shops
Gulf, Texas & Western	1	Flat	.....	.....	.....	.....	.....	.....	Company Shops
Kellys Creek & Northwestern	1	Caboose	.....	49 ft. 0 in.	Wood	.....	Spring	.....	Am. Car & Fdy.
Louisiana & North West	2	Caboose	.....	.....	.....	.....	.....	.....	Company Shops
Northwestern Pennsylvania	1	Box	40,000	32 ft. 0 in.	Wood	24,000	.....	Arch Bar	Company Shops
St. Louis & O'Fallon	1	Coal	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Tennessee Coal, Iron & R. R.	140	Hopper	140,000	.....	.....	.....	.....	.....	Chickasaw Ship
	300	Ore	.....	.....	Steel	.....	.....	.....	Chickasaw Ship
Private Car Lines and Industrials									
Am. Refrig. Transit Co.	*100	Steel Und'frames	.....	.....	.....	.....	.....	.....	General American
Associated Oil Co.	8	Tank	8,050	.....	.....	.....	.....	.....	Penn. Tank Car
Barnes Circus	4	Flat	80,000	70 ft. 0 in.	St. Und'frame	43,400	Friction	.....	Mt. Vernon
	2	Stock	80,000	70 ft. 0 in.	St. Und'frame	56,600	Friction	.....	Mt. Vernon
	3	Stock	80,000	70 ft. 0 in.	St. Und'frame	56,700	Friction	.....	Mt. Vernon
	2	Flat	80,000	70 ft. 0 in.	St. Und'frame	43,500	Friction	.....	Mt. Vernon
Beacon Oil Co.	20	Tank	100,000	34 ft. 5 in.	All Steel	48,600	Friction	Arch Bar	General American
Clemmons Logging Co.	6	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
	4	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Coates Driving & Boom Co.	1	Ballast	80,000	34 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Cudahy Refrig. Line	500	Refrig.	60,000	39 ft. 1 in.	St. Und'frame	.....	.....	.....	Haskell & Barker
Dist. of Columbia	3	Gondolas	100,000	41 ft. 9 in.	All Steel	40,400	Spring	.....	Mt. Vernon
	4	Gondolas	100,000	40 ft. 0 in.	All Steel	39,800	Spring	.....	Mt. Vernon
Easton Car & Const. Co.	1	Hopper	100,000	40 ft. 0 in.	Steel	41,800	Spring	.....	Mt. Vernon
Eatonville Lbr. Co.	1	Flat	200,000	44 ft. 0 in.	All Steel	.....	Spring	.....	Pac. Car & Fdy.
English Lumber Co.	25	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
	1	Caboose	60,000	31 ft. 0 in.	St. Und'frame	.....	Spring	.....	Pac. Car & Fdy.
Ferro Construction Co.	1	Flat	110,000	47 ft. 10 in.	St. Und'frame	29,000	Friction	.....	Standard Steel
Green River Lbr. Co.	1	Logging	80,000	50 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Irland Steel Co.	20	Gondola	140,000	40 ft. 0 in.	Steel	47,600	Friction	.....	Bettendorf
Insular Lumber Co.	12	Logging	60,000	40 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Jeddo-Highland Coal Co.	4	Dump	30 cu. yd.	32 ft. 2 in.	Steel	57,000	Friction	.....	Clark
Live Poultry Transportation Co.	200	Poultry	60,000	36 ft. 0 in.	Steel Frame	.....	Friction	.....	Am. Car & Fdy.
	100	Poultry	60,000	36 ft. 0 in.	Steel Frame	.....	Friction	.....	Am. Car & Fdy.
McCoy Loggie Logging Co.	1	Caboose	60,000	31 ft. 0 in.	St. Und'frame	.....	Spring	.....	Pac. Car & Fdy.
Mahoning Ore & Steel Co.	10	Dump	30 cu. yd.	32 ft. 2 in.	Steel	57,000	Friction	.....	Clark
Massack Timber Co.	1	Logging	80,000	42 ft. 0 in.	All Wood	.....	Spring	.....	Pac. Car & Fdy.
Mathieson Alkali Co.	20	Special	60,000	42 ft. 5 in.	Steel	38,000	Friction	.....	Standard Steel
Merrill & Ring	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Morris & Co.	18	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Mud Bay Logging Co.	15	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Nemah River Lbr. Co.	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Pennsylvania Tank Line	200	Tank	10,000g.	.....	.....	.....	.....	.....	Penn. Tank Car
Phoenix Logging Co.	1	Flat	200,000	44 ft. 0 in.	Steel	.....	Spring	.....	Pac. Car & Fdy.
Poinsett Lubricating Co.	5	Logging	80,000	37 ft. 0 in.	Steel	31,100	Spring	.....	Bettendorf
River & Rail Trans. Co.	1	Flat	100,000	42 ft. 0 in.	St. Und'frame	43,900	Friction	.....	Mt. Vernon
Rutledge Timber Co.	2	Flat	80,000	41 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Saddle Mt. Logging Co.	1	Flat	120,000	40 ft. 0 in.	Steel	.....	Spring	.....	Pac. Car & Fdy.
	6	Logging	100,000	.....	Steel	.....	Spring	.....	Pac. Car & Fdy.
Schafer Bros.	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Shell Co. of Calif.	20	Tank	10,000	.....	Steel	.....	Friction	Arch Bar	Std. Tank Car
Simpson Logging Co.	1	Flat	200,000	44 ft. 0 in.	Steel	.....	Spring	.....	Pac. Car & Fdy.
Skelly Oil Co.	20	Tank	8,000g.	.....	All steel	.....	.....	.....	Gen. Am. Tk. Car
Stauffer Chemical Co.	1	Tank	8,000g.	.....	.....	.....	.....	.....	Gen. Am. Tank
U. S. Engineers	3	Flat	50,000	30 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Vancouver Equipment Co.	30	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
	2	Ballast	80,000	34 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Veneese, J. A., Lbr. Co.	4	Logging	100,000	.....	Steel	.....	Spring	.....	Pac. Car & Fdy.
Washington Iron Works	1	Flat	120,000	44 ft. 0 in.	Steel	.....	Spring	.....	Pac. Car & Fdy.
Waterbury Gas Light Co.	1	Coal	100,000	.....	.....	.....	.....	.....	General American
Webb Logging Co.	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Pac. Car & Fdy.
Various purchasers	83	Cars not otherwise reported		.....	.....	.....	.....	.....	Am. Car & Fdy.
Railroads and Other Companies in Canada									
Canadian Pacific	3	Pit	47,720	37 ft. 6 in.	Steel	162,000	Friction	.....	Can. Car & Fdy.
	3	Flat	.....	.....	Steel	.....	Friction	.....	Can. Car & Fdy.
Imperial Oil	8	Dump	60,000	33 ft. 0 in.	Steel	39,000	Spring	.....	National
Quebec Central	5	Flat	60,000	36 ft. 0 in.	Wood	24,400	Spring	Arch Bar	Company Shops
	5	.....	80,000	40 ft. 0 in.	.....	26,500	.....	.....	Company Shops
Temiskaming & Northern Ontario	6	Caboose	.....	29 ft. 0 in.	.....	.....	Spring	.....	Canadian Brill

*Not included in totals.

Orders for Export

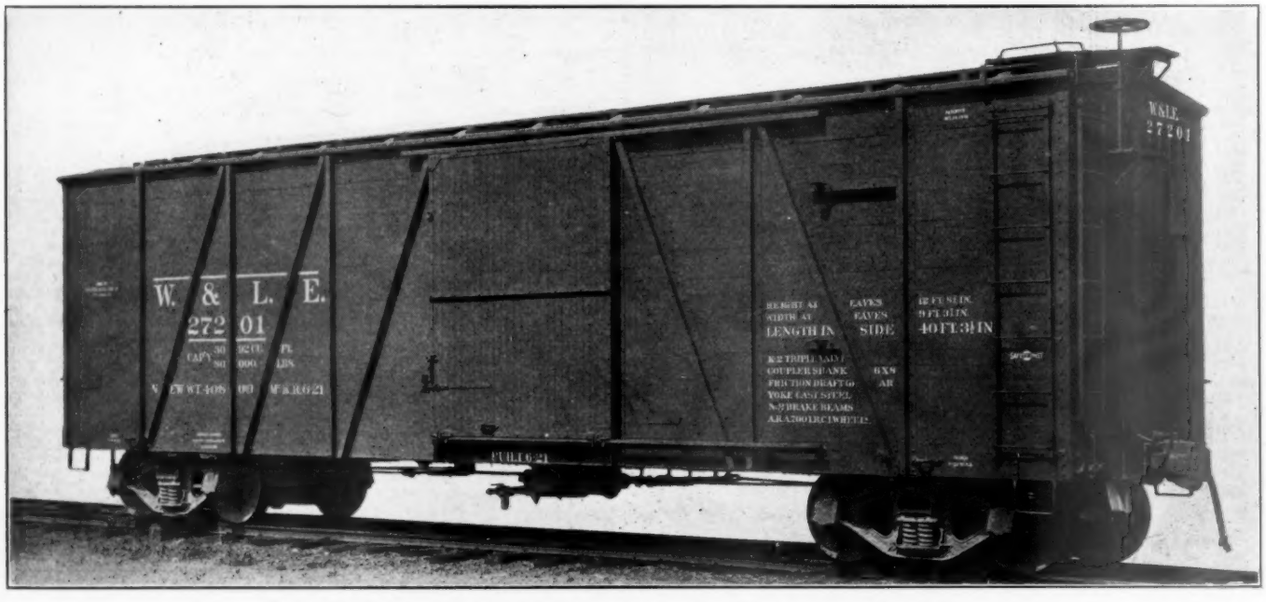
Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft gear	Trucks	Builder
Argentine State Rys.	1,500	Box	66,000	33 ft. 3 in.	St. Und'frame	29,000	Spring	.....	Standard Steel
	400	Gondola	66,000	33 ft. 10 in.	St. Und'frame	26,000	Spring	.....	Standard Steel
	100	Caboose	.....	30 ft. 6 in.	St. Und'frame	34,000	Spring	.....	Standard Steel
Baldwin Locomotive Works	1	Gondola	80,000	28 ft. 0 in.	Steel	36,000	Spring	.....	Standard Steel
Atlantic Fruit Co.	100	Cane	40,000	.....	.....	.....	.....	.....	Magor Car Co.
	4	Flat	40,000	.....	.....	.....	.....	.....	Magor Car Co.
Chilian State Rys.	200	Box	66,100	32 ft. 7 in.	Steel	.....	Friction	.....	Am. Car & Fdy.
	20	Refrig.	66,100	25 ft. 7 in.	St. Und'frame	.....	Friction	.....	Am. Car & Fdy.
	100	Gondola	100,000	.....	.....	.....	.....	.....	Pressed Steel
Chinese Government Rys.	300	Box	80,000	40 ft. 0 in.	Steel	.....	Friction	.....	General American
	300	Gondolas	80,000	40 ft. 0 in.	Steel	.....	Friction	.....	General American
Compannia Unias	6	Tank	6,575g.	23 ft. 9 in.	Steel	38,000	Spring	.....	Standard Steel
Cuba Northern	5	Box	60,000	37 ft. 0 in.	Steel Frame	.....	Friction	.....	Amer. Car & Fdy.
Japanese Gov't Rys.	50	Dump	.....	.....	.....	.....	.....	.....	Kilbourne & Jac.
Java State Rys.	50	Box	26,500	19 ft. 0 in.	Steel Frame	.....	Spring	.....	Am. Car & Fdy.
	50	Gondola	26,500	18 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
Gold Coast Colony	100	Dump	5 yards	9 ft. 9 in.	Steel Frame	39,000	Spring	.....	National
Katanga Railroad	25	Gondola	70,000	39 ft. 4 in.	Steel	37,400	.....	.....	Pressed Steel
Mex. Light, Heat & Power Co.	1	Tank	6,500g.	.....	.....	.....	.....	.....	Penn. Tank Car
Monterrey Iron & Steel	20	Hopper	100,000	30 ft. 5 in.	Steel	.....	Friction	.....	General American
National Rys. of Mexico	100	Tank	100,000	32 ft. 0 in.	Steel	49,600	Friction	Arch Bar	Am. Car & Fdy.
Republic of Colombia	12	Box	33,600	30 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
	20	Flat	44,800	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	6	Flat	44,800	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	2	Stock	33,600	30 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
	6	Stock	33,600	30 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
	10	Gondola	40,000	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	6	Gondola	44,800	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	6	Dump	4 cu. yd.	12 ft. 6 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	20	Box	33,600	30 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
South Manchurian Ry.	40	Dump	20 cu. yd.	.....	.....	.....	.....	.....	Kilbourne & Jac.
Russian Soviet Gov't.	500	Tank	8,000g.	30 ft. 7 in.	Steel	46,000	Friction	.....	Can. Car & Fdy.
St. Louis Refr. Car Co.	3	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Tientsin-Pukow	300	Gondola	80,000	.....	Steel	.....	.....	.....	Am. Car & Fdy.
Uganda Railways	2	Gondola	60,000	39 ft. 11 in.	Steel	39,000	Spring	.....	National
United Fruit Co.	50	Box	40,000	.....	.....	.....	.....	.....	Gregg
	40	Flat	40,000	.....	.....	.....	.....	.....	Gregg
	50	Ballast	.....	.....	Steel	.....	.....	.....	Magor
	50	Cane	.....	.....	.....	.....	.....	.....	Magor
	20	Flat	.....	.....	.....	.....	.....	.....	Magor
Wah Chang Trading Corp.	349	Cars not otherwise reported.							Am. Car & Fdy.
Various Foreign Purchasers	58	Tank	8,000g.	25 ft. 10 in	Steel	39,200	Spring	.....	Chicago Steel Car

From 1873, when the first two Washington navel trees were imported into the State of California, the citrus fruit industry has grown in size and importance until today approximately 180,000 acres in California are devoted to the growing of oranges, and 50,000 acres to lemons. The fruit which is shipped annually from the state averages from 25,000 to 30,000 carloads of navel oranges, 10,000 to 15,000 carloads of Valencias and about 9,000 carloads of lemons and grapefruit. In recent years, owing to the growing demand for Valencias, the fruit is shipped during the entire year, navel oranges moving from November to May, and Valencias from May to November. It is predicted that when the acreage now planted comes into full bearing, approximately 20,000 more cars of citrus fruit will be shipped annually.

During the season of 1919, 42,443 cars, loaded with citrus fruit, were moved from California. This is equivalent to 849 trains of 50 cars each.

Further, taking an average of 448 boxes per car for the oranges, and 392 boxes per car for the lemons, there was a total of 14,822,528 boxes of fruit or 746,804 tons.

The rate to Eastern points during 1919 was $1.44 per 100 lb. on oranges and $1.25 on lemons. This would yield a total of $17,492,290 in freight earnings. The shipper fared well during the 1919 season, receiving $3.75 a box for oranges and $3.50 a box for lemons or a total revenue of $68,422,283. The by-products are important. The factories are now annually producing approximately 50,000 lb. of lemon oil, 1,500,000 lb. of citric acid and orange marmalade, citrate of lime and vinegar in large quantities.



Built by the Pressed Steel Car Co. for the Wheeling & Lake Erie

Built by the American Car & Foundry for the New York Central Lines

Passenger Car Purchases Small During 1921

Fewest Orders in Any Year on Record Except 1918—Sizeable Foreign Buying

By Frank W. Kraeger

THE PASSENGER CARS ordered for service in the United States totaled in 1921 but 246. This is the smallest number in any year on record for at least 20 years, with the exception of the year 1918, when every energy was bent towards war-time activities. Foreign orders in 1921 totaled 155. Several important orders were included. The figure compares with 38 cars ordered for export in 1920 and 143 in 1919.

TABLE I. THE PASENGER CAR ORDERS OF 1921

For Class I railroads	207
Other domestic	39
Total domestic	246
For service in Canada	91
For export to other countries	155
Grand total	492

The passenger car production, as distinguished from orders, was 1,275, as compared with 1,272 in 1920. Cars built for export totaled only 39.

The review of the orders for passenger cars in 1920, which appeared in the *Railway Age* of January 7, 1921, page 141, said: "The totals for orders of passenger cars during the past year give proof of the upward trend which was noted in the statistical report on passenger car orders last year." Unfortunately the upward trend did not continue into 1921. The reason can only be laid at the door of decreased net railway operating income. In the article on locomotive business during 1920, which appears elsewhere in this issue, evidence is presented that orders for new locomotives could hardly have been expected while the roads were not in a position and did not find it necessary, while they had engines in white lead, to reduce their percentage of unserviceable locomotives. This is not the case with passenger equipment. The railroads need passenger cars. They have purchased but few in the last five years in spite of the greatly increased business developed during these years. The result is shown in the statistics of passengers carried per car or per train and in the fact that passenger service at present,

TABLE II. ORDERS FOR PASSENGER CARS SINCE 1901

Domestic orders only

	Passenger cars		Passenger cars
1901	2,879	1909	4,514
1902	3,459	1910	3,881
1903	2,310	1911	2,623
1904	2,213	1912	3,642
1905	3,289	1913	3,179
1906	3,402	1914	2,002
1907	1,791	1915	3,101
1908	1,319		

Domestic and Foreign

Year	Domestic	Foreign	Total
1916	2,544	109	2,653
1917	1,124	43	1,167

Year	Class I railroads	Other domestic	Total domestic	Canadian	For export	Grand total
1918	5	104	109	22	26	157
1919	....	....	292	347	143	782
1920	1,115	666	1,781	275	38	2,094

TABLE III. PASSENGER CARS BUILT IN 1921

	United States	Canada	Total
Domestic	1,275	361	1,636
Foreign	39	...	39
	1,314	361	1,675

Comparison with Previous Years

Year	Passenger Domestic	Passenger Foreign	Passenger Total
1899	1,201	104	1,305
1900	1,515	121	1,636
1901	1,949	106	2,055
1902	From 1902 to 1907 passenger		1,948
1903	car figures in these two		2,007
1904	columns included in corre-		2,144
1905*	sponding frt. car columns.		2,551
1906*	....	...	3,167
1907*	....	...	5,457
1908*	1,645	71	1,716
1909*	2,698	151	2,849
1910*	4,136	276	4,412
1911*	3,938	308	4,246
1912†	2,822	238	3,060

1913	2,559	220	2,779	517	....	517	3,296
1914	3,316	56	3,366	325	....	325	3,691
1915	1,852	14	1,866	83	....	83	1,949
1916	1,732	70	1,802	37	....	37	1,839
1917	1,924	31	1,955	45	....	45	2,000
1918	1,480	92	1,572	1	....	1	1,503
1919	306	85	391	160	....	160	551
1920	1,272	168	1,440	....	....	....	....

*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

even with its improvement over war and after-armistice federal control conditions, is by no means as satisfactory as railroad men would like to see it.

The tendency for many years has been towards steel passenger train equipment. The Interstate Commerce Commission in its latest annual report repeats its previous recommendation that the use of steel cars in passenger service be required. The progress in the direction of replacing wooden cars in the past few years has been disappointing. The lack of such progress will only increase the difficulties of the carriers, should the Commission's recommendation ever be adopted and put in the form of an act of Congress.

Only two roads placed fair-sized orders for passenger train equipment during 1921. The New York, Ontario & Western ordered 32 cars and the Reading, 50. The latter is expected shortly to order additional cars. The Missouri, Kansas & Texas ordered 54 cars, but 50 of these were express refrigerator cars and are included in the passenger car list only because they will presumably be operated in passenger trains.

South America and China were the largest foreign buyers. The Argentine Government ordered 53, the Chilean State Railways ordered ten, and railways in Colombia, 28. The Tientsin-Pukow of China gave us an order for 45. It is noteworthy that in the case of the Chilean and Tientsin-Pukow cars, all-steel construction was specified.

Passenger Car Orders in 1921

Class I Railroads

Purchaser	No.	Class	Length	Construction	Seating capacity	Weight	Wheels per truck	Lighting	Builder
Baltimore & Ohio	2	Dining	81 ft. 7 in.	St. Und'frame	36	161,800	6	Electric	Pullman
Delaware, Lack. & Western	2	Bagg. & Mail	74 ft. 1 in.	Steel	..	128,000	6	Electric	Am. Car & Fdy.
Florida East Coast	6	Coach	70 ft. 0 in.	Steel	76	144,000	6	Electric	Pullman
Grand Trunk	10	Horse Exp.	76 ft. 9½ in.	St. Und'frame	..	143,000	6	Electric	Osgood Bradley
Gulf, Mobile & Northern	1	Passenger	.....	Wood	..	.....	..	.....	Company Shops
Louisville & Nashville	5	Coach	78 ft. 7 in.	Steel	80	.....	6	Electric	Am. Car & Fdy.
	5	Coach	78 ft. 7 in.	Steel	80	.....	6	Electric	Am. Car & Fdy.
	4	Baggage	73 ft. 7 in.	Steel	..	.....	6	Electric	Am. Car & Fdy.
Missouri, Kansas & Texas	4	Dining	79 ft. 6 in.	Steel	36	162,000	6	Electric	Am. Car & Fdy.
	50	Exp. Refr.	42 ft. 11 in.	St. Centr. Sills	..	70,600	4	.....	Company Shops
N. Y., New Haven & Hartford	8	Motor	70 ft. 7 in.	Steel	84	175,000	4	Electric	Osgood-Bradley
	14	Trailer	70 ft. 7 in.	Steel	84	105,000	4	Electric	Osgood-Bradley
New York, Ontario & Western	20	Coach	78 ft. 10½ in.	Steel	88	120,000	4	Electric	Osgood-Bradley
	4	Pass. & Bagg.	75 ft. 9 in.	Steel	52	118,000	4	Electric	Osgood-Bradley
	4	Baggage	63 ft. 4 in.	Steel	..	110,000	4	Electric	Osgood-Bradley
	4	Bagg. & Mail	63 ft. 4 in.	Steel	..	115,000	4	Electric	Osgood-Bradley
Philadelphia & Reading	30	Passenger	72 ft. 4 in.	Steel	78	115,500	4	Electric	Bethlehem Ship.
	5	Comb.	72 ft. 4 in.	Steel	51	112,000	4	Electric	Bethlehem Ship.
	15	Passenger	72 ft. 4 in.	Steel	78	115,500	4	Electric	Standard Steel
Union Pacific	14	Dining	83 ft. 11 in.	Steel	36	158,000	6	Electric	Pullman

Other Domestic Purchasers

E. Tenn. & West. N. Carolina	1	Bagg. & Mail	46 ft. 8 in.	St. Und'frame	..	.....	4	Electric	Am. Car & Fdy.
	2	Coach	44 ft. 4 in.	St. Und'frame	24	.....	4	Electric	Am. Car & Fdy.
Hagerstown & Frederick	1	Combination	48 ft. 4 in.	Steel	60	51,500	4	Electric	Brill
Hudson & Manhattan	25	Car Bodies	.....	Steel	..	.....	..	.....	Am. Car & Fdy.
Hunt. & Broad Top Mt.	5	Passenger	72 ft. 2 in.	Steel	78	120,000	4	Electric	Bethlehem Ship.
	2	Pass. & Bagg.	72 ft. 2 in.	Steel	51	111,000	4	Electric	Bethlehem Ship.
	3	Bagg. & Mail	66 ft. 8 in.	Steel	..	110,000	4	Electric	Bethlehem Ship.

Railways and Other Companies in Canada

Canadian Pacific	72	Passenger	.....	.....	..	.....	..	.....	Company Shops
	15	Mail	80 ft. 0 in.	Steel	..	.....	6	Gas	Can'd'n Car & F'y
Grand River	1	Bagg. & Exp.	63 ft. 8 in.	Steel	..	.....	..	.....	Canadian Brill
Quebec Central	1	Baggage	73 ft. 6 in.	Wood	..	76,700	4	Electric	Company Shops
	2	1st Class	79 ft. 9 in.	.....	82	91,600	4	.....	Company Shops

Orders for Export

Argentine Govt. Rys.	53	Various Types	.....	.....	..	.....	..	.....	Osgood-Bradley
Canton-Kowloon	2	Motor	.....	.....	..	.....	..	.....	Hall-Scott
	1	Trailer	.....	.....	..	.....	..	.....	Hall-Scott
Chichibu Rys. of Japan	3	Motor Pass.	.....	.....	..	.....	..	.....	Westinghouse
Chilean State Railways	2	Sleeper	44 ft. 9 in.	Steel	16	.....	4	Electric	Am. Car & Fdy.
	2	Diners	44 ft. 9 in.	Steel	31	.....	4	Electric	Am. Car & Fdy.
	2	1st Class	44 ft. 9 in.	Steel	46	.....	4	Electric	Am. Car & Fdy.
	2	3rd Class	44 ft. 9 in.	Steel	69	.....	4	Electric	Am. Car & Fdy.
	2	Bagg. & Mail	44 ft. 9 in.	Steel	..	.....	4	Electric	Am. Car & Fdy.
Columbia, Republic of	6	1st Class	40 ft. 0 in.	St. Und'frame	48	.....	4	Oil	Am. Car & Fdy.
	6	3rd Class	40 ft. 0 in.	St. Und'frame	61	.....	4	Oil	Am. Car & Fdy.
	2	Bagg. & Mail	38 ft. 3 in.	St. Und'frame	..	.....	4	Oil	Am. Car & Fdy.
	2	1st Class	40 ft. 0 in.	St. Und'frame	48	.....	4	Oil	Am. Car & Fdy.
	4	2nd Class	40 ft. 0 in.	St. Und'frame	50	.....	4	Oil	Am. Car & Fdy.
	6	3rd Class	40 ft. 0 in.	St. Und'frame	61	.....	4	Oil	Am. Car & Fdy.
	2	Bagg. & Mail	38 ft. 3 in.	St. Und'frame	..	.....	4	Oil	Am. Car & Fdy.
Musachino Rys. of Japan	4	Motor Pass.	.....	.....	..	.....	..	.....	Westinghouse
Peru, South America	1	2nd Class	30 ft. 0 in.	St. Und'frame	60	20,000	8	Oil and Elect.	Wason
	1	Combination	30 ft. 0 in.	St. Und'frame	40	20,000	8	Oil and Elect.	Wason
Tientsin-Pukow	10	1st Class Sleeping	72 ft. 6 in.	Steel	16	.....	4	Electric	Am. Car & Fdy.
	10	2nd Class Sleeping	72 ft. 6 in.	Steel	28	.....	4	Electric	Am. Car & Fdy.
	10	3rd Class Sleeping	72 ft. 6 in.	Steel	48	.....	4	Electric	Am. Car & Fdy.
	5	Sleeping	72 ft. 6 in.	Steel	24	.....	4	Electric	Am. Car & Fdy.
	5	Dining	72 ft. 6 in.	Steel	36	.....	4	Electric	Am. Car & Fdy.
	5	Private	76 ft. 6 in.	Steel	11	.....	4	Electric	Am. Car & Fdy.
Various Foreign Purchasers	2	Bagg. & Mail	48 ft. 7 in.	St. Und'frame	..	.....	4	Electric	Am. Car & Fdy.
	2	Pass. & Bagg.	46 ft. 6 in.	St. Und'frame	42	.....	4	Electric	Am. Car & Fdy.
	1	1st Class	44 ft. 4 in.	St. Und'frame	36	.....	4	Electric	Am. Car & Fdy.
	2	2nd Class	44 ft. 4 in.	St. Und'frame	64	.....	4	Electric	Am. Car & Fdy.

C. H. MARKHAM, PRESIDENT OF THE ILLINOIS CENTRAL, replying to an open letter of W. H. Johnston, president of the International Association of Machinists, exposes the misleading nature of statements issued by Johnston concerning the valuation of the railroads made by the Interstate Commerce Commission. "Since you use miles of track in arriving at your estimated value per mile, of the 24 railroads, you should also have used miles of track, instead of miles of line, in making your estimate of the value of all the railroads.

If you had used the correct figures your estimate of the total valuation in the United States would have been $4,640,000,000 (over 50 per cent) more than the estimate you actually made—which shows the utter fallacy of the comparison. The railways whose tentative valuations you and Mr. Plumb cite have only about seven per cent of the total trackage in the country. These are not representative roads. The valuation of all the railroads cannot be fairly or intelligently estimated upon any such unrepresentative basis."

Dividend Changes on Railroad Stocks in 1921

Apprehension of Early Months Not Borne Out— Lackawanna and Burlington Increase Rate

By Charles W. Foss

APPREHENSION as to whether the railroad boards of directors would or would not declare the regular dividends of their respective companies was an ever-present feature in financial centers throughout the better part of 1921. The apprehension at times was directed at good roads and bad, because during the early part of the year even the more fortunate roads were unable to show promising figures of net railway operating income.

The year is now behind us. It develops that the apprehensions, while they were amply justified by the contemporaneous conditions, were by-and-large not borne out in the final results. Realizing the manner in which nerves were kept on edge during the earlier and middle parts of the year, it is somewhat surprising to see how few changes really did take place during 1921 in the matter of dividend payments or changes in the rates of dividends declared. The record of the year was not good, but it was much better than many of the most optimistic would have hoped for, say, eight months ago.

The outstanding feature, of course, was the reduction in the Pennsylvania Railroad dividends from 1½ per cent quarterly to 1 per cent. Next we may put the deferring of the Southern Railway 2½ per cent semi-annual dividend on the preferred. The action of the Chesapeake & Ohio directors in deferring the 2 per cent semi-annual dividend on the common was also serious, but the C. & O. has since restored its former rate.

On the other hand, there were the Chicago, Burlington & Quincy and Lackawanna. The former declared a 54 per cent stock dividend and has since paid 25 per cent dividends on the increased capitalization. The Delaware, Lackawanna & Western, which formerly paid 5 per cent quarterly dividends, declared a 100 per cent stock dividend and is now paying at the rate of 3 per cent quarterly on the doubled capitalization and has recently declared an extra of 5 per cent.

The Interstate Commerce Commission, in its annual report issued recently, has a table covering dividend payments for the past ten years. The table shows that whereas in 1911 67.65 per cent of the stock of the railroads was paying dividends, but 57.24 per cent paid dividends in 1920. The amount paid in dividends in 1911 was $460,195,376; in 1920, but $328,989,492. The average rate on dividend paying stock declined from 8.03 per cent in 1911 to 6.51 in 1920; the rate on all stock from 5.42 to only 3.72. It would be difficult to indicate what has taken place with railway stocks in these years in a more striking manner. The figures given in the report follow:

CAPITAL STOCK AND DIVIDENDS, 1911-1920

Steam Roads, Excluding Switching and Terminal Companies

Year ended	Proportion of stock paying dividends, per cent	Amount of dividends	Average rate on: Dividend paying stock per cent	Average rate on: All stock per cent
June 30, 1911....	67.65	$460,195,376	8.03	5.42
June 30, 1912....	64.73	400,315,313	7.17	4.64
June 30, 1913....	66.14	369,077,546	6.37	4.22
June 30, 1914....	64.39	451,653,346	7.97	5.13
June 30, 1915....	60.45	328,477,938	6.29	3.80
June 30, 1916....	60.38	342,109,396	6.48	3.91
Dec. 31, 1916....	62.02	366,561,494	6.75	4.19
Dec. 31, 1917....	63.32	381,851,548	6.81	4.24
Dec. 31, 1918....	58.09	339,185,658	6.60	3.83
Dec. 31, 1919....	59.64	335,241,935	6.33	3.77
Dec. 31, 1920....	57.24	328,989,492	6.51	3.72

The important changes in dividend rates which took place in 1921 are shown in the following table:

Name of road	Per cent declared 1921	Per cent declared 1920	Annual rate at present	Annual rate 1920
Chesapeake & Ohio, common	2	4	4	4
Colorado & Southern, common	3	...	...	...
Chicago, Burl. & Quincy, old capitalization	2	8	...	8
Chicago, Burl. & Quincy, new	25	...	10	...
Chicago, St. Paul, Minn & Omaha, preferred	6	7	5	7
Dela., Lack. & Western, old capitalization	10	20	...	20
Dela., Lack. & Western, new	11	...	12	...
Hocking Valley, common	2	4	4	4
New York, Ont. & Western	2	1	...	1
Pennsylvania Railroad	4½	6	4	6
Pittsburgh, Cincinnati, Chicago & St. Louis	...	4	...	4
Southern Railway, preferred	...	5	...	5
West Jersey & Seashore	...	5	...	5

Pennsylvania Railroad. The Pennsylvania's action in reducing the dividend rate from 1½ per cent quarterly to 1 per cent was taken on April 27. This was the first time in 22 years that the Pennsylvania had reduced the annual dividend rate below 6 per cent. Since 1899 it has paid 6 per cent annually with the exception of 1906 when the rate was 6½ per cent and 1907 when it was 7 per cent. All of the stock of the Pittsburgh, Cincinnati, Chicago & St. Louis with the exception of about 1 per cent is owned by the Pennsylvania Company; the road had been paying 2 per cent semi-annually but action on this dividend was deferred at a meeting held June 22. The Pennsylvania owns $6,747,900 of the $11,586,250 stock of the West Jersey & Seashore. The latter deferred its semi-annual dividend of 2½ per cent in March. The road had been paying dividends since 1896, most of the time at 5 per cent. In 1906 the rate was raised to 8 per cent; in 1908, reduced to 4 and has been 5 per cent since 1910.

Southern Railway. The directors at a meeting on May 12 failed to take action on the regular semi-annual dividend of 2½ per cent on the preferred stock, usually paid June 30. The dividends on the preferred stock have varied considerably, ranging since 1897 from none to 5 per cent. In 1915 and 1916 no dividends were paid; on November 20, 1917, 2½ per cent was declared; April 30, 1918, 2½ per cent; November, 1918, 2½ per cent; 1919, 5 per cent, and 1920, 5 per cent.

Chesapeake & Ohio. On May 20, 1921, the directors of the Chesapeake & Ohio deferred action on the regular semi-annual dividend of 2 per cent due June 30, 1921. In November, however, a dividend of 2 per cent was declared payable January 3 to stockholders of record December 2. The Chesapeake & Ohio from 1899 to 1908 paid 1 per cent annually. In 1909 it paid 3 per cent; from June, 1910, to June, 1913, at the rate of 1¼ quarterly. In 1914, 3 per cent was paid. No dividends were paid between December, 1914, and December, 1916, at which time a rate of 2 per cent semi-annually was established.

The Hocking Valley's rate of 2 per cent semi-annually on the common goes back to December, 1915. As in the case of the C. & O., the dividend was deferred in June but restored in November.

Chicago, Burlington & Quincy. This company declared a stock dividend of 600,000 shares, or 54.132 per cent, to stockholders of record March 31. Inasmuch as the details were given prominence in the *Railway Age* at the time, it is not necessary to repeat them. The Burlington, on its former capitalization, paid quarterly dividends at the rate of 8 per

cent annually; this rate began in 1908 and was paid to March this year, except in September, 1917, when an extra dividend of 10 per cent was paid. Following the declaration of the stock dividend, or on May 26, a dividend of 5 per cent was declared without reference to any annual rate. On December 1 additional dividends were declared, including a semi-annual dividend of 5 per cent and an extra dividend of 15 per cent. The proceeds nearly all go to the Northern Pacific and Great Northern and will assist the two latter roads materially in maintaining their own dividends, which in 1921 were paid from surplus rather than from current earnings. The Burlington dividends in 1921 included 2 per cent on its old capitalization and 25 per cent on the new capitalization.

The Colorado & Southern paid a dividend of 3 per cent on its common stock in December. This was the first dividend on this issue since 1912, when 1 per cent was paid. The Burlington owns $23,667,500 of the C. & S. $31,000,000 common stock.

Delaware, Lackawanna & Western. The Lackawanna stock dividend of 100 per cent, or about $45,000,000, represented a capitalization of about one-half the company's surplus. The company has been paying dividends of 20 per cent annually since 1910. The 100 per cent stock dividend was declared July 28, payable August 20. The directors, on September 29, declared a quarterly dividend of 3 per cent payable October 20. This is at the rate of 12 per cent annually on the new capitalization, or 24 per cent on the former capitalization. On December 29, in addition to declaring the regular quarterly dividend of 3 per cent, they declared an extra dividend of 5 per cent, to be paid out of surplus, payable January 20 to stock of record January 7.

Receiverships and Foreclosure Sales During 1921

Mileage Operated by Receivers Now Totals 14,324, as Compared with 17,197 Miles at End of 1920

THE MILEAGE OF ROADS in the hands of receivers at the end of 1921 was, according to the compilations of the *Railway Age*, 14,502. This represents the smallest mileage in the hands of receivers since 1912. It compares with 17,197 miles in receivership at the end of 1920 or with the total of 37,353 on June 30, 1916. During the year two large roads were reorganized and taken out of receiver's hands. One of these was the Denver & Rio Grande, operating 2,485 miles of line, and the other was the Chicago & Eastern Illinois, operating 1,131 miles.

The Missouri, Kansas & Texas Lines, operating a total of 3,807 miles, are about to be taken from the receivership lists. The plan of reorganization was announced in November and will presumably be made effective within a short time. The road must be shown in the 1921 totals of roads in the hands of receivers, but it must be borne in mind that the 1921 total mileage of 14,380 is about to be reduced in the amount of the Katy system mileage of 3,807.

The roads that went into the hands of receivers during 1921 totaled 14 with a mileage of 1,744. But one important road was included, the Atlanta, Birmingham & Atlantic, which has been in receivership on various previous occasions. The 1921 figure compares with 10 roads having 541 miles of line which went into the hands of receivers during 1920.

The year 1921—until recent months at least—was an exceedingly poor year from the standpoint of both gross and net earnings. Under former conditions it might have been expected that more roads would have gone into the hands of receivers than did so. The Transportation Act, however, has given an entirely different aspect to the situation as it has in the case of many other things. The new feature, insofar as the matter of receiverships is concerned, is the loan fund administered by the Interstate Commerce Commission. The commission, in both 1920 and 1921, has made loans to several carriers for the purpose of assisting them in meeting maturities. Presumably, in the majority of cases, other methods of meeting these maturities would have been worked out, had this method not been available, but there can be little question that in a few cases, at least, receivership was made considerably less of a possibility.

It is fortunate that the money markets are much easier than they were, but it must be realized that during much of the period we have just passed through the financial centers were in far from a receptive mood. There is also a new element in the situation in that the country now has an entirely new attitude towards receiverships from what it used to have. It can hardly be denied that with our new regulation and the increased amount of it, to put a railroad company into the hands of receivers is a much more serious matter than it used to be. This deterring influence is a potent one.

Another entirely different angle of the situation is the matter of abandoned lines. As is pointed out in an article on that subject which appears elsewhere in this issue, the

RECEIVERSHIPS ESTABLISHED IN 1921

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Alabama & Mississippi	78	$184,000	$10,000
Atlanta, Birmingham & Atlantic	640	9,592,407	30,000,000
Colorado, Wyoming & Eastern	111	2,390,000	4,300,000
Columbus & Greenville	226	200,000	50,000
Dayton, Toledo & Chicago	95	386,980	300,000
Delaware & Northern	50	20,000	1,250,000
Gainesville Midland	74	1,009,726	550,000
Gulf, Texas & Western	99	2,000,000	500,000
Hampdens Railroad Corp	15	.....	1,400,000
Knoxville, Sevierville & Eastern	28	500,000	500,000
Muscatine, Burlington & Southern	53	569,900	750,000
Savannah & Atlanta	147	3,365,000	2,250,000
Tennessee Railroad	61	1,376,900	229,700
Wichita Falls, Ranger & Fort Worth	67	67,500	120,000
	1,744	$21,662,413	$42,209,700

FORECLOSURE SALES IN 1921

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding	Remarks
Chicago & Eastern Illinois	1,131	$55,419,150	$18,267,900	Turned over to new company Jan. 1, 1922.
Collins & Ludcwici	37	.....	.....	To be dismantled.
Denver & Rio Grande	2,485	120,728,000	87,775,670	Sale in Nov., 1920; confirmed March 28, 1921.
Gulf, Florida & Alabama	143	4,446,000	4,660,000	Sale not yet confirmed.
Illinois Southern	140	3,398,000	5,000,000	Operated now as Missouri-Illinois.
Knoxville, Sevierville & Eastern	28	500,000	500,000	
Midland Pennsylvania	10	812,300	86,000	
Tennessee, Alabama & Georgia	95	364,683	1,446,577	Has asked court's permission to scrap line.
Valdosta, Moultrie & Western	42	.....	350,000	May be dismantled; 3½ miles already taken up.
Williamsport & North Branch	44	545,000	1,324,662	Reorganized May 16, 1921.
Wyoming & Missouri River	18	.....	500,000	
	4,173	$186,213,133	$119,910,809	

Interstate Commerce Commission has been overwhelmed with requests for authority to abandon operation of lines or sections of lines. This is reflected in the list of roads in the hands of receivers. Nine roads in the hands of receivers are shown as having abandoned the operation of their lines. The Alabama & Mississippi, which went into the hands of receivers in March, 1921, has since been granted authority by the Interstate Commerce Commission to abandon 67 miles of line. The Missouri & North Arkansas—in the hands of receivers since 1912—has had, primarily because of labor troubles, to cease the operation of its 365-mile line. The Louisiana & Northwest—in receivership since 1912—has already taken up 22 miles.

RAILROAD MILEAGE IN THE HANDS OF RECEIVERS

(Figures to 1919, Inclusive, from I. C. C. Statistics for Year Ended December 31, 1919)

Years ended	Miles of road operated by receivers at close of year	Net change during the year in miles of road operated	Number of roads in charge of receivers at close of year
June 30, 1894	40,819	.....	192
1895	37,856	—2,963	169
1896	30,476	—7,380	151
1897	18,862	—11,614	128
1898	12,745	—6,117	94
1899	9,853	—2,892	71
1900	4,178	—5,675	52
1901	2,497	—1,641	45
1902	1,475	—1,022	27
1903	1,185	—290	27
1904	1,323	+138	28
1905	796	—527	26
1906	3,971	+3,175	34
1907	3,926	—45	29
1908	9,529	+5,603	52
1909	10,530	+1,001	44
1910	5,257	—5,273	39
1911	4,593	—664	39
1912	9,786	+5,193	44
1913	16,286	+6,500	49
1914	18,608	+2,322	68
1915	30,223	+11,615	85
1916	37,353	+7,130	94
Dec. 31, 1916	34,804	—*2,550	80
1917	17,376	—17,428	82
1918	19,208	+1,832	74
1919	16,590	—2,618	...
1920	17,197	.....	...
1921	14,502	.....	...

*Represents decrease for six months.

SUMMARY OF FORECLOSURE SALES 1876 TO 1921

Year	Number of roads	Miles	Bonds and stocks
1876	30	3,840	$217,848,000
1877	54	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	12	2,629	250,033,000
1910	17	1,100	93,660,109
1911	13	1,386	40,741,543
1912	12	661	25,910,990
1913	6	1,159	86,163,850
1914	9	1,470	83,189,500
1915	11	3,914	285,258,782
1916	26	8,355	703,444,855
1917	20	10,963	557,846,348
1918	11	763	24,735,187
1919	8	459	15,479,587
1920	7	380	7,676,200
1921	11	4,173	306,123,942

Several of the roads which went through the experience of a foreclosure sale during the year were bought up by the dealer in second-hand material. The Collins & Ludowici is one. The Tennessee, Alabama & Georgia, owning 95 miles of line, has asked permission of the court to scrap the line. The fate of the Valdosta, Moultrie & Western, 42 miles, is, according to latest reports, still in the balance. At one time it was destined to be taken up but more recently some interests have proposed the possibility of restoring operations. Some of the line, however, has already been taken up.

Railroads shown in the lists of receiverships in former years have for the most part been removed from that list by reorganization. The increasing proportion of those eliminated because of their being dismantled is a factor which naturally will be watched with great interest.

ROADS GOING INTO RECEIVERSHIP, 1876 TO 1921

Year	Number of roads	Miles	Bonds and stocks
1876	42	6,662	$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
1879	12	1,102	39,367,000
1880	13	885	140,265,000
1881	5	110	3,742,000
1882	12	912	39,074,000
1883	11	1,990	108,470,000
1884	37	11,038	714,755,000
1885	44	8,836	385,460,000
1886	13	1,799	70,346,000
1887	9	1,046	90,318,000
1888	22	3,270	186,814,000
1889	22	3,803	99,664,000
1890	26	2,963	105,007,000
1891	26	2,159	84,479,000
1892	36	10,508	357,692,000
1893	74	29,340	1,781,046,000
1894	38	7,025	395,791,000
1895	31	4,089	369,075,000
1896	34	5,441	275,597,000
1897	18	1,537	92,909,000
1898	18	2,069	138,701,000
1899	10	1,019	52,285,000
1900	16	1,165	78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2,606	210,606,882
1912	13	3,784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689
1917	19	2,486	61,169,962
1918	8	3,519	242,090,800
1919	7	244	11,886,779
1920	10	541	21,620,150
1921	14	1,744	63,872,113

The three most important roads involved in the receiverships and foreclosure sales during 1921 were the Denver & Rio Grande, the Chicago & Eastern Illinois and the Missouri, Kansas & Texas.

The Denver & Rio Grande is shown in the list of foreclosure sales during 1921. That road was actually sold in November, 1920, but was not included in the 1920 foreclosures, because of the litigation pending at the time, and because the sale had not been confirmed at the time the list was made up. The sale was finally confirmed in the federal court in Denver on March 28, 1921. J. H. Young was elected president of the new Denver & Rio Grande Western in April. The formal transfer to the new company was to have taken place May 30 but further difficulties intervened and the transfer was not completed until about July 31.

The Chicago & Eastern Illinois reorganization plan was dated March 31, 1921. The plan reduced the fixed charges of the old company from $3,759,996 to $2,327,051 for the new. Two portions of the old company's line—the Chicago & Indiana Coal Railway and the Evansville & Indianapolis—were not acquired by the new company. The foreclosure

sale took place at Danville, Ill., on April 5. Announcement was made in November by Kuhn, Loeb & Co., reorganization managers that the plan and agreement were operative. Further announcement was made in December that the new securities would be ready for distribution on and after December 27. The Chicago & Eastern Illinois was turned over to the newly reorganized company on January 1, 1922.

The Missouri, Kansas & Texas reorganization plan was announced November 23. Details concerning it were given in the *Railway Age* of November 26, pages 1043 and 1044.

RAILROADS IN THE HANDS OF RECEIVERS

Name of Road	Mileage	Date of Receivership	Bonds of old company	Stock of old company	Total old company securities	Remarks
Alabama & Mississippi	78	March 17, 1921	$184,000	$10,000	$194,000	Authorized to abandon line.
Altoona Northern	16	August 8, 1919	370,000	675,000	1,045,000	
Atlanta, Birmingham & Atlantic	640	February 25, 1921	9,592,407	30,000,000	39,592,407	
Birmingham & Southeastern	48	July 26, 1920	747,606	728,000	1,475,606	
Birmingham, Columbus & St. Andrews	38	December 25, 1918	250,000	4,000,000	4,250,000	
Cape Girardeau Northern	104	April 14, 1914	1,156,000	110,000	1,266,000	
Chicago, Peoria & St. Louis	247	August 1, 1914	2,850,000	4,000,000	6,850,000	
Colorado Midland	338	July, 1918	9,532,000	10,000,000	19,532,000	Operation discontinued.
Colorado Springs & Cripple Creek District	74	May 2, 1919	2,640,000	2,000,000	4,640,000	Operation discontinued.
Colorado, Wyoming & Eastern	111	November 30, 1921	2,390,000	4,300,000	6,690,000	
Columbus & Greenville	226	June 4, 1921	200,000	50,000	250,000	
Dansville & Mount Morris	15	June 7, 1894	150,000	50,000	200,000	
Dayton, Toledo & Chicago	95	April 29, 1921	386,980	300,000	686,980	
Delaware & Northern	50	March 16, 1921	20,000	1,250,000	1,270,000	
Denver & Salt Lake	255	August 16, 1917	12,731,000	583,515	13,314,515	
Eagles Mere	10	March 22, 1920	72,000	49,000	121,000	
Eastern Kentucky	36	March 31, 1919	.....	3,455,900	3,455,900	
Fort Smith & Western	254	October 9, 1915	6,240,000	5,000,000	11,240,000	Reorganization approved by I. C. C.
Gainesville Midland	74	February 15, 1921	1,009,726	550,000	1,559,726	
Georgia & Florida	405	March 27, 1915	9,052,000	8,750,000	17,802,000	
Gulf, Florida & Alabama	143	May 9, 1917	4,446,000	4,660,000	9,106,000	
Gulf, Texas & Western	99	January 24, 1921	2,000,000	500,000	2,500,000	
Hampden Railroad Corp.	15	March 17, 1921	.....	1,400,000	1,400,000	Not operated.
Hawkinsville & Florida Southern	96	July 17, 1920	586,000	100,000	686,000	Abandoned, but not taken up.
Helena, Parkin & Northern	16	July 3, 1919	65,000	100,000	165,000	
Houston & Brazos Valley	30	October 27, 1915	420,000	24,000	444,000	
International & Great Northern	1,160	August 10, 1914	26,315,000	4,822,000	31,137,000	
Kansas City, Mexico & Orient	272	April 16, 1917	33,500,000	20,000,000	53,500,000	
Kansas City Northwestern	171	February 23, 1917	.....	1,400,000	1,400,000	Operation discontinued.
Louisiana & Northwest	121	August 22, 1913	2,250,000	2,300,000	4,550,000	22 miles taken up.
Macon & Birmingham	97	February 1, 1908	500,000	500,000	1,000,000	
Manistee & North Eastern	214	December 24, 1918	1,052,000	2,000,000	3,052,000	
Memphis, Dallas & Gulf	130	September 10, 1920	2,052,000	2,052,000	4,104,000	Operation discontinued.
Midland & Northwestern	65	March 1, 1920	213,666	10,035	223,701	Operation discontinued.
Missouri & North Arkansas	365	April 1, 1912	8,340,000	8,340,000	16,680,000	Operation discontinued.
Missouri, Kansas & Texas Lines	3,807	September 27, 1915	143,411,824	76,309,557	219,721,381	Reorganization plan announced.
Morgantown & Wheeling	26	July 26, 1916	500,000	343,000	843,000	
Muscatine, Burlington & Southern	53	May 20, 1921	569,900	750,000	1,319,900	
Northwestern Terminal	5	January 21, 1920	2,273,000	3,000,000	5,273,000	
Ocilla Southern	69	June 30, 1918	416,000	265,000	681,000	
Ocklawaha Valley	54	January 21, 1918	.....	250,000	250,000	
Paris & Mt. Pleasant	54	February 26, 1920	600,000	75,000	675,000	
Pine Bluff & Northern	8	February 9, 1916	.....	160,000	160,000	
Pittsburg, Shawmut & Northern	210	August 1, 1905	14,655,600	15,000,000	29,655,600	
Rome & Northern	23	February 28, 1911	.....	1,000,000	1,000,000	
St. Louis, El Reno & Western	42	October 9, 1915	817,000	970,800	1,787,800	
Salina Northern	81	July 28, 1917	1,500,000	1,143,000	2,643,000	
San Antonio, Uvalde & Gulf	315	August 12, 1914	4,413,000	280,000	4,693,000	
Savannah & Atlanta	147	March 4, 1921	3,365,000	2,250,000	5,615,000	
Sharpsville Railroad	18	January 21, 1897	.....	350,000	350,000	
Tennessee Railroad	61	January 22, 1921	1,376,900	229,700	1,606,600	
Tennessee Central	293	January 1, 1913	12,220,900	8,000,000	20,220,900	I. C. C. to investigate proposed reorganization as Tennessee Midland.
Texas & Pacific	1,953	October 27, 1916	54,876,000	38,755,110	93,631,110	
Toledo, Peoria & Western	230	July 2, 1917	4,895,000	4,076,900	8,971,900	
Toledo, St. Louis & Western	454	October 22, 1914	27,602,000	19,947,600	47,549,600	
Trinity & Brazos Valley	303	June 16, 1914	9,357,014	304,000	9,661,014	
Wabash, Chester & Western	65	July 15, 1914	690,000	1,250,000	1,940,000	
Waupaca-Green Bay	10	September 1, 1917	69,000	61,400	130,400	May be merged with Green Bay & Western.
West Virginia Midland	46	May 20, 1920	600,000	500,000	1,100,000	
Wichita Falls, Ranger & Fort Worth	67	December 26, 1921	67,500	120,000	187,500	
	14,502		$425,589,023	$299,460,517	$725,049,540	

St. Paul Wants to Acquire C. M. & G.

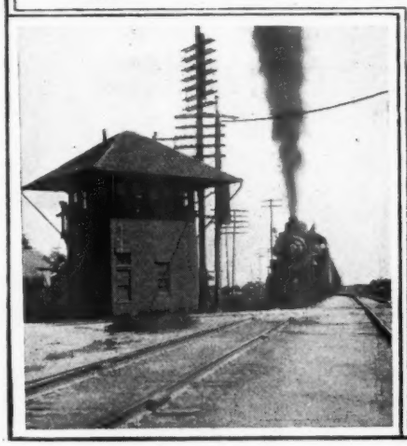
The Chicago, Milwaukee & St. Paul has applied to the Interstate Commerce Commission for authority to purchase the Chicago, Milwaukee & Gary and thus gain a direct connection with the Chicago, Terre Haute & Southeastern, which road has been operated by the St. Paul since July, 1921, when it was acquired by lease, and purchase of its capital stock. The Chicago, Milwaukee & Gary has a total mileage of 141.86 miles, 96.83 miles of which are main line between Rockford, Ill., and Aurora, and between Joliet and Delmar. It also has trackage rights over the Elgin, Joliet & Eastern between Aurora and Joliet, a distance of 22.49 miles, and recently applied to the Interstate Commerce Commission for authority to build between these points. The St. Paul will make connections with the Gary line at Delmar, Ill., and Rockford. Should the St. Paul acquire the line it will be able to transport coal and other freight originating on the Chicago, Terre Haute & Southeastern to its own lines and the northwest on its own tracks. The purchase would also give the St. Paul the advantage of an outer belt line around the Chicago terminal district.

The Chicago, Milwaukee & Gary was incorporated March 3, 1908, in Illinois, to acquire by purchase and construction a line of road from Milwaukee, Wis., to Gary, Ind. The company acquired the railroad and property of the Illinois, Iowa & Minnesota, with its subsidiary lines and the Illinois, Indiana & Gary. Extensions were projected from Delmar to La Crosse, Ind., 36 miles, and from Rockford, Ill., to Milwaukee, Wis. The assets of the company in 1920 were $10,381,869, as against a capital stock of $1,000,000, a funded debt of $5,798,000, current liabilities of $2,718,540, and unadjusted credits and deferred liabilities of $865,329.

During the year 1920 the road operated with a combined federal and corporate deficit of $278,078.

The St. Paul plans to acquire from the St. Louis Trust Company, $1,000,000 par value in stock and $5,700,000 par value in first mortgage bonds, the entire securities issue of the road and to return to the trust company, $3,000,000 of bonds after guaranteeing their payment, interest and principal.

Signal and Interlocking Work Shows Slight Gain



On the Santa Fe in Texas

Construction Activities Show a Little Improvement Over 1920, Which Was the Lowest Since 1905

By K. E. Kellenberger

In the California Mountains

SIGNAL CONSTRUCTION has been spoken of as the barometer of the railroad field because authorizations for such work generally are the last to be approved and the signal budgets are among the first to be cut. Thus, the financial conditions of the railroads are reflected through this department's activities. On this basis it is interesting to note that the block signal mileage (manual and automatic) installed, increased rapidly from 1906 to 1915. The construction curve flattened out materially during 1908 and again, although not to the same extent, in 1913. Construction work was carried on actively in 1914 but has slumped decidedly from that date to the present. In 1919 statistics indicated that railway signaling was on the decline, while in 1920 construction activities were lighter than during any period since 1905. Conditions improved but slightly during 1921.

Taking the progress in automatic signal construction for the 10 years preceding 1915 as normal and comparing it with that for the seven years from January 1, 1915, to January 1, 1922, we find that the progress in the latter years has been far from satisfactory. The average mileage installed for the 10-year period preceding 1915 was 2448.4, while for the seven-year period to date the average has been 1291.1 miles. The difference between the two leaves a net deficiency per year of 1157.3 miles, or a total for the seven years of 8101 miles. In order to get back to what we have taken as the normal rate of installation it would be necessary in a period of five years for the roads to install a total of 4068 miles each year. The diagram illustrates the tendencies in signal construction since 1906.

ONLY 824 miles of road in the United States and Canada were equipped with block signals during the past year; 174.9 miles under construction in the two countries and 613.6 miles are known to be proposed for 1922.

Fifty-nine interlocking plants are completed; 24 are under construction; 30 are proposed for 1922.

The tendency is toward the operation of trains by signal indication without written train orders.

Block Signaling Completed in 1921

A total of 824 miles of road in the United States and Canada was equipped with block signals during the past year. Part of the mileage represents new construction, a portion represents reconstruction and a part consists of automatic block signals installed in place of the manual system. Where automatic signaling was in use previously, the changes were due largely to signaling certain tracks for running trains in either direction on the same track. Other changes consisted of replacing one type of signals with another or new signals for additional main tracks. One notable feature about our tables is the very short stretches of automatic signals installed. Station and curve protection, shortening of block sections, better facilities for approaches to yards, and small sections of dense traffic territory were the occasions for the majority of the signals installed; which naturally means a small mileage at each location.

Thirty roads built new interlocking plants or made changes in existing ones, affecting a total of 59 plants. Canada is represented by six plants.

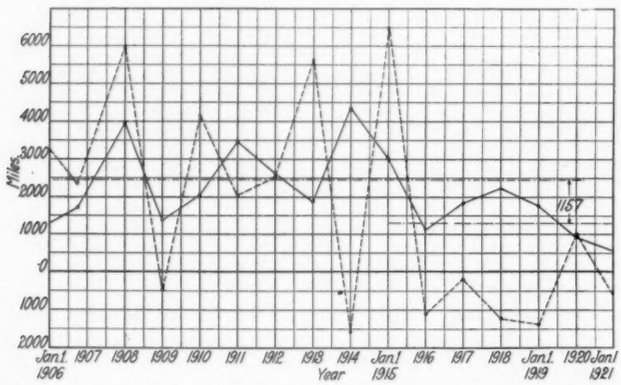
Comparing the figures for 1921 with those for 1920, published in the January 7, 1921, issue of the *Railway Age*, it is seen that there has been a slight increase in construction work of this character, as the total block signal mileage completed in the United States and Canada during 1921 was 824 as compared to 523.5 miles of road in 1921. Of this 824 miles, 209.8 represents manual blocking installed, which leaves 614.2 miles of road on which automatic block signals were placed. This figure, however, is likely higher than the actual additional mileage installed because in some cases additions have been made to installations already in service. A slight increase is thus noted in the additional mileage of automatic signaling constructed, as this is 90 miles more than in 1920. Comparing this mileage with that reported by the Interstate Commerce Commission as of January 1, 1921, and which is recorded in the table showing block signals installed in the United States since January 1, 1907, there appears to have been 10.8 miles more automatic block signaling completed during 1921 than in 1920. In each year shown in that table the mileage of automatic block signals installed was more than double that reported for the years 1920 and 1921.

In comparing the total mileage of block signals under construction in the United States and Canada on December 31, 1921, with that under construction on the same date in

1920, it is seen that there is now a decrease of 42.2 miles. The total mileage under construction on December 21, 1921, was entirely in the United States, no Canadian roads having reported any work in progress. The work in progress consisted of automatic block signaling exclusively, there being no manual block under construction at the end of the year. Some of the work going in replaces manual blocking, while in other cases it consists of the replacement of one type of apparatus with another.

Work Proposed for 1922

The proposed block signal work for next year represents 613.6 miles of road to be equipped with automatic block signals. It will be noted that this is but half a mile less than was installed during 1921. The plans of many of the



Signal Construction Since 1905. Dotted Line, Manual Block; Solid Line, Automatic. Average Deficiency in Automatic Block Signal Mileage Installed Is 1,157 Miles a Year Under That for Period, 1905-1914

roads, however, are very indefinite as they have not as yet decided on their budgets. Expressions received from a number of the roads tend to indicate that at least twice this mileage is to be installed unless there is a decided change in the conditions affecting the finances of the railroads. In making a comparison of the block signal mileage proposed for next year with that proposed one year ago it is seen that there is an increase over that of a year ago of 103.8 miles of road. The proposed new work reported is for 577.6 miles of automatic block signals in the United States and 36 miles of the same type in Canada. No manual block signaling is proposed at the present time.

Interlocking Construction in 1921

There has been a slight increase in the number of interlocking plants built or rebuilt, as compared with 1920, when a total of 43 were built or rebuilt in the United States, and two in Canada as compared to 53 in United States this year, and six in Canada. The number of plants under construction in the United States on December 31, 1920, was 18, and one in Canada, as compared to 24 this year, none of which are in Canada. A total of 22 plants was proposed a year ago, none being in Canada, in comparison with a total of 21 for the coming year in the United States and nine in Canada.

Signal Construction Data

The figures so far available, together with the data covering the work now under construction and in respect to plans for 1922, are shown in the accompanying tables under nine heads as follows:

A—Automatic Block Signaling Completed in 1921.
B—Automatic Block Signaling Under Construction.
C—Automatic Block Signaling Proposed for 1922.
D—Manual Block Signaling Completed in 1921.
E—Manual Block Signaling Under Construction (None).
F—Manual Block Signaling Proposed for 1922 (None).
G—Interlocking Completed in 1921.
H—Interlocking Under Construction.
I—Interlocking Proposed for 1922.

New Block Signals Completed in 1921

	Automatic (Table A)			Manual (Table D)			Both,
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	miles
United States.	293.0	264.7	557.7	209.8	....	209.8	767.5
Canada	56.5	....	56.5	....	....	....	56.5

New Block Signals Under Construction Dec. 31, 1921

	Automatic (Table B)			Manual (Table E)			Both,
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	total miles
United States.	119.3	55.6	174.9	....	....	....	174.9
Canada	....	....	....	....	....	....	....

New Signals Proposed for 1922

	Automatic (Table C)			Manual (Table F)			Both,
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	total miles
United States.	348.	229.6	577.6	....	....	....	577.6
Canada	30.	6.	36.0	....	....	....	36.0

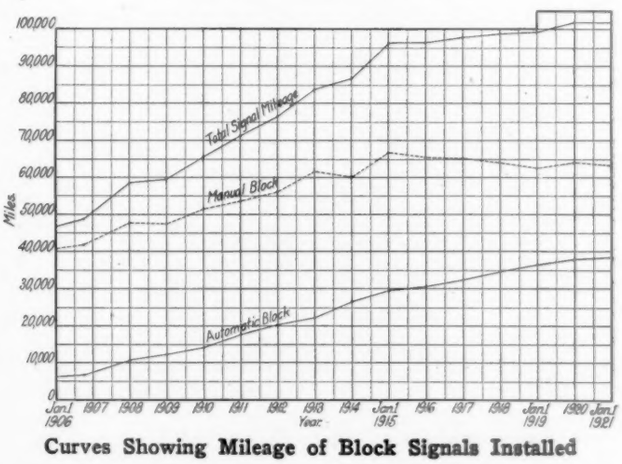
Interlocking Plants

	No. of plants	Number of levers	
		Mechanical	Electric
Table G Completed in 1921			
United States.....	53	501	429
Canada	6	57	....
Table H Under Construction Dec. 31, 1921			
United States.....	24	223	241
Canada	...	....	....
Table I Proposed for 1922			
United States.....	21	182	378
Canada	9	86	24
Total United States.....	98	906	1,048
Total Canada	15	143	24
Grand total.....	113	1,049	1,072

TOTAL CONSTRUCTION—THIRTEEN YEARS—I. C. C. REPORTS

Year	Miles of road		
	Automatic block	Manual block	Total
1908.....	1,387.6	—517.6	870.0
1909.....	2,047.1	4,162.2	6,209.3
1910.....	3,473.8	2,037.3	5,511.1
1911.....	2,623.4	2,517.2	5,140.6
1912.....	1,883.9	5,656.2	7,540.1
1913.....	4,350.5	—1,563.4	2,787.1
1914.....	3,030.7	6,511.5	9,542.2
1915.....	1,113.1	—1,112.0	1.1
1916.....	1,843.5	—196.9	1,646.6
1917.....	2,242.2	—1,214.9	1,027.3
1918.....	1,794.9	—1,398.4	396.5
1919.....	979.4	1,007.1	1,986.5
1920.....	575.1	—575.7	—0.6

From the reports received, the largest mileage of automatic signals installed on any one road was on the Missouri,



Curves Showing Mileage of Block Signals Installed

Kansas & Texas, which put in service 153.75 miles of single track, using 253 signals. The next largest installations were made on the Cleveland, Cincinnati, Chicago & St. Louis, which put in service 68.1 miles of double track, using 121 signals, and the Great Northern which installed 58 miles of single track, using 111 signals. The Canadian National Railways installed 52 miles of single track and 4.5 miles

of double track automatic block signaling, using a total of 111 signals. Signals installed on other roads consisted mostly in the protection of short stretches of track or new multiple tracks or for curve and station protection purposes.

But nine roads report automatic block signals under construction at the end of the year, the greatest mileage reported being by the Missouri, Kansas & Texas, which has 63.5 miles of single track signaling under way, using 98 signals. The Chesapeake & Ohio has under construction 40 miles of single track, A. P. B. color-light automatic signals, using 88 signals, while the Pennsylvania is installing 19.4 miles of double track and 15 miles of four-track position-light automatic signals, using a total of 96 signals for this purpose.

Of the 10 roads reporting work proposed for 1922, the Northern Pacific contemplates the construction of 155 miles of single track and 48 miles of double track signaling, using 378 signals. This road also contemplates replacing d. c. track circuits with a. c. track circuits on 68 miles of road. The Great Northern has in view the construction of 165 miles of single track automatic signaling, while the Atchison, Topeka & Santa Fe contemplates 6.8 miles of single track and 57.6 miles of double track automatic block signaling, using 80 signals. The reports from the various roads on proposed work are rather incomplete as many have not as yet prepared their programs or had their budgets approved for 1922. The Canadian National Railways propose to install 30 miles of single track and six miles of double track automatic block signaling during the coming year.

The manual block signaling installed during 1921 consisted of 204.6 miles of single track, 141 miles of which was on the Fort Worth & Denver City, a total of 16 two-arm signals being used. The Chicago & North Western installed 61 miles, using 9 two-arm signals, while the Los Angeles & Salt Lake put in service 2.6 miles of controlled manual block, using the staff system. No manual signaling was under construction at the end of the year, or proposed for the coming year.

Automatic Train Control

An installation of automatic train control is under construction on the Chesapeake & Ohio, between Charlottesville, Va., and Staunton, a distance of 40 miles. An a. c. power transmission line is being built over this territory and color-light signals are to be used in connection with the train control. This installation is in single track territory. The Chicago, Lake Shore & South Bend reports 1½ miles of automatic train control placed in service.

Interlocking Construction Data

Thirty roads report interlocking plants as completed or reconstructed during the past year. Table G gives this list in detail. It is necessary that this be considered more as an exhibit of the work done than as showing the precise amount of the increase of such apparatus in use in the country as some of the figures represent reconstruction or enlargements; and, also, some duplications necessarily occur as a plant may be reported by two or more roads. The same remarks apply also to Tables H and I.

Aside from the small amount of work completed, under construction or contemplated, it is interesting to note that the plants are all of comparatively small size. A number of electro-mechanical plants appear in the tables as do additions of electric units to existing plants, thus obviating the necessity of enlarging existing towers. Considerable work has been done in replacing mechanical detector bars with detector locking.

An analysis of the plants shows that the largest electric plant completed during the year is one of 57 working levers at Carlton, Minn., on the Great Northern, while the next largest is one of 44 working levers at Richmond, Ind., on the Pennsylvania. The third largest plant of this type had 23 working levers and was installed at Myerstown, Pa., on the Philadelphia & Reading. The largest electro-pneumatic machine completed was one of 45 levers at Phillipsburg, N. J., on the Central of New Jersey.

Two electro-pneumatic push-button machines were reported as completed in 1921, both on the New York, New Haven & Hartford. These are for hump yard operation, one (36 push buttons) at New Haven, Conn., and the other (23 push buttons) at Providence, R. I.

Seven electro-mechanical plants were reported as completed; one on the Cleveland, Cincinnati, Chicago & St. Louis having 50 mechanical and 12 electric working levers and another on the same road having 41 mechanical and 16 electric working levers.

The largest mechanical plant installed was on the Baltimore & Ohio at Tates Point, Ohio; it had 34 working levers. The next largest plant consisted of 29 working levers and is on the Illinois Central at Ramsey, Ill. Other plants range in size from one of three levers up to the largest mentioned above. One plant is of the cabin-door lock type, while others are equipped with a. c. track circuits, time locks, electric and detector locking; power distant signals and position light signals.

Interlocking Plants Under Construction

The largest electric interlocking plant under construction on December 31, 1921, was at Schoharie Junction, N. Y., on the Delaware & Hudson and consists of 25 working levers. The next in size is one having 21 working levers at Altamont, Wyo., on the Union Pacific.

The Interborough Rapid Transit, New York City, has under construction two electro-pneumatic plants, one of 44 working levers at 180th street and the other with 10 working levers at New Lots avenue, on the East Parkway line (Brooklyn).

The largest electro-mechanical plant under construction, as of the above date, is one of 43 working levers at Mountain Lake Park on the Baltimore & Ohio, while the Chesapeake & Ohio is building one having nine mechanical and 11 electric working levers at Hinton, W. Va.

The largest mechanical plant under construction is one having 24 working levers at Pontiac, Mich., on the Grand Trunk; the next largest being one of 20 working levers at Finch, N. Y., on the New York Central.

Proposed Interlocking Work

Of the plants proposed for 1921, the largest electric plant is one of 56 working levers to be located at Sierra Vista, Calif., on the Pacific Electric; the next largest being one of 22 working levers at Charlotte, Mich., on the Grand Trunk.

The Interborough Rapid Transit, the Chesapeake & Ohio and the Philadelphia & Reading report proposed installations of electro-pneumatic plants during the present year. The first named road is planning on three plants of 52, 50 and 32 working levers, respectively; the second road proposes to build a 28-lever machine, while the P. & R. contemplates installing one of 53 working levers and one of 42 working levers.

The largest electro-mechanical plant in prospect is one of 10 mechanical and 19 electric working levers at Atlantic City, N. J., on the P. & R. The second largest will consist of eight mechanical and 19 electric working levers at St. Albans, W. Va., on the C. & O.

The Philadelphia & Reading proposes to install a 35-working lever mechanical interlocking at Schuylkill Haven, Pa., while the Missouri, Kansas & Texas contemplates one of 18 working levers at Mound City, Kan.

The General Outlook

The general outlook a year ago appeared favorable for increased signal construction, but instead work during 1921

has been largely in a state of coma as compared to that during normal periods. For the coming year, returns indicate that prospects in general are not bright for signal construction work in the eastern and southeastern sections of the country, while in the central, northwestern and southwestern sections, indications point to a renewal of signal work. Returns indicate that 8600 miles of automatic block signals and 95 interlocking plants should be installed to meet the traffic conditions adequately. The extent to which these needs will be met in 1922 depends on business conditions.

The maintenance work in practically all cases is up to standard and it is the expectation to keep it in this condition, although a few roads report maintenance as being from six months to three years behind.

One condition which appears to have influenced signal construction to a certain extent is the price of signal materials. On the one hand the railroads are waiting until a more extensive reduction is made in the prices of such equipment, while the manufacturers find that their actual costs are as high or higher than during the war, because the small volume of business is not sufficient to pay for the labor and material and to take care of the overhead; and the actual cost of production is greater than the selling price in many instances. When production takes place on an extensive scale to fill increased orders prices should descend accordingly.

Developments of the Past Year

A review of the conditions during the past year shows that the tendency is towards better train operation by signaling selected stretches of double-track lines for movements in either direction on either track. The movement of tonnage trains has also been facilitated in some localities by the installation of grade signal aspects. Railway men in general have shown a keener appreciation of the value of automatic signaling with reference to its use in effecting economies in train operation. In this connection, the elimination in automatic signal territory of the train order form requiring conductors' signatures has been put into effect to a limited extent on some roads, while others are considering such a step. Studies have been made looking toward operating trains on single track by signal indication without written train orders.

The elimination of the derail is a subject which has also been receiving serious consideration, as has the development of automatic signaling at railway grade crossings with a view of eliminating the use of an interlocking tower and the necessary attendants. The use of low voltage switch movements for the remote operation and control of switches at passing sidings, junction points, etc., is a live question and installations are being made.

Automatic train control is being given serious consideration, not only by well-informed and progressive railroad officers but by the Interstate Commerce Commission and by the Joint Committee on Train Control of the American Railway Association. An extension of automatic train control is being made on one road, while arrangements have been made for testing several devices under actual railway service on other roads.

In the engineering end, the electric lighting of signals has proved economical and has made rapid advances in the past year; and there is a greater use of the primary battery. A study of track-circuit conditions has pointed out ways of effecting other economies in signal maintenance. The color-light and position-light signals (for daylight signaling) are being used more extensively than ever before. The use of the mechanical rectifier for charging storage batteries for operating automatic signals and highway crossing warnings is receiving careful consideration and some installations already have been made. The use of portable power units for operating tools and for signal bonding has been another development of interest. At interlocking plants, many mechanical detector bars have been eliminated and replaced by electric detector locking. The reason for this is explained largely by the use of heavier rails. Highway crossing protection has received careful study by signal department officers.

Future developments of signaling will continue along the line of expediting train movements. Means will be provided for controlling the movement of trains by signal indication and greater use will be made of remote controlled switches which will be operated from the nearest interlocking tower or station. Greater use will be made of light signals and the installation of light signals, with automatic train control as an adjunct, with the elimination of the derail promises to be a development of the near future. Train operation by signal indication without the use of written train orders should make rapid progress, while automatic signals for controlling train movements at outlying crossings will likely be installed at certain locations during the present year.

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1921

Name of road	Miles of road Single track	Miles of road Double track	From	To	No. of signals	Type of signals	Control system	Remarks
A. T. & Santa Fe	...	11.5	Plymouth, Kan.	Strong City, Kan.	15	Union Style T-2	Neutral track and line.	
	5.1	...	Ft. Worth, Tex.	Saginaw, Tex.	11	Union Style T-2	Neutral track and line.	
B. & Ohio	...	1.2	33rd St.	Millvale	5	Union Style T-2		
	...	7.1	Bakerstown, Pa.	Callery Jct.	15	Union Style T-2		
	...	4.5	Bakerstown, Pa.	Wildwood	14	Union Style T-2		Relaid track.
Canadian Nat'l Extension Lines	20.0	...	Hampton	Coldbrook	35	Union Style T-2	A. P. B.	Changed from overlap.
	30.0	...	Painsee Jct.	Sackville	60	G. R. S, 2-A	A. P. B.	
	4.5	...	Charny		12	G. R. S, 2-A	Selective automatic.	
	2.0	...	Hervey Jct.		4	G. R. S, 2-A	Selective automatic.	
C. B. & Quincy	...	33.2	Osceola, La.	Creston	100	Motor	Straight automatic.	
C. & N. Western	1.4	...	Belt Line Jct., Wis.	Hurley Jct.	8	General 2-A		D. C., 3-pos., U. O.
C., Lake Shore & S. B.	...	1.5	Griffin, Ohio	Ice House	7	Color light		A. C., 60-cycle, 3 color.
Chi., R. I. & P.	0.7	...	M. P. 291		2	Semaphore, motor		
C. C. C. & St. L.	...	63.2	Berea, Ohio	Crestline	109	Hall, Style L		D. C., 3-pos., U. O., bot. post.
	...	4.9	Beech Grove, Ind.	Indianapolis	12	Hall, Style L		D. C., 3-pos., U. O., bot. post.
D. L. & W. (Three-track)	...	0.7 / 4.4	Hackensack River	Newark, N. J.	41	Color light, 4-unit	D. C. neutral track and A. C. polar line	Tracks 1 and 3 signaled in both directions between Hackensack River and Harrison. Track 2 signaled in eastward direction only.
Elgin, J. & E.	0.5	...	Yard		2	Union Style B		
Illinois Central	19.7	...	Lisley, Ky.	Princeton	36	Hall, Style L, U. O., N. C.	Traffic direction	
Interboro R. T.	...	1.0	158th Street	174th Street	11	Color-Light 6 Electro p. Sem., 5		On suburban line; three-track.
	...	1.1	125th Street	155th Street	23	Color-light		On Ninth Ave; three-track.
	...	1.6	91st Street	125th Street	21	Color-light		Second Ave.; three-track.
G. Northern	58.0	...	Leavenworth, Wash.	Skyokmish	100	General, 2-A	Polarized line	D. C., 3-pos., U. O., top post.
					11	Color light		Light signals used in snow sheds.
G. Trunk (New England)	13.5	...	Oxford, Me.	Danville Jct.	22	General, 2-A	A. P. B.	
	...	1.5	Komoka	Danville Jct.	2	General, 2-A	Station protection	
	1.5	...	Port Hope	Danville Jct.	2	Federal	Station protection	

Name of road	Miles of road: Single track	Miles of road: Double track	From	To	No. of signals	Type of signals	Control system	Remarks
Kensington & E.	...	1.5	Kensington, Ill.	Crossover	7	Union Model "L" light.		
M. K. & Texas	.07	...	Dallas Yards		5	3 Style S, 2-Lt., Union.	Light	Electric lights, continuous.
	2.0	...	San Antonio, Tex.		2	Style L Light	Automatic	Electric lights, app. control.
	1.5	...	Colbert	Red River	4	Style S Union	Automatic	Electric lights, app. control.
	38.0	...	McAlester, Okla.	Springtown	62	Style S Union	Automatic	Electric lights, app. control.
	66.0	...	McAlester, Okla.	Wybark	109	Style S Union	Automatic	Electric lights, app. control.
	44.0	...	Labette, Okla.	Vinita	67	Style S Union	Automatic	Electric lights, app. control.
	1.5	...	Oklahoma City	Yards	4	Style S Union	Automatic	Electric lights, app. control.
L. & Nashville	...	4.0	Mayton, Tenn.	Brentwood	9	A. C. semaphore	Polarized track	
N. Y. N. H. & H.	...	1.2	New Haven, Conn.		4	2 Union light, 2 G.R.S., semaphore		For reverse traffic signaling, tracks 1 and 2.
N. Y. Connecting	...	8.1	Fresh Pond, N. Y.	Oak Point	4	1 Union sem., 3 G.R.S., semaphore		To replace manual block, U. O. left hand.
P. & R.	...	3.1	Fifth St., Reading, Pa.	Wyomissing	7	Union T-2		A. C., 3-pos., U. O., top post,
(Three-track)	.09	...	Lebanon, Pa.	Front St.	3	Union T-2		A. C., 3-pos., U. O., top post. 1 Hall disk.
(Four-track)	...	4.6	Myerstown, Pa.	Lebanon, Pa.	16	Union T-2		A. C., 3-pos., U. O., top post.
Pennsylvania System:								
Eastern Region	...	4.7	Mt. Vernon	Hollins	11	9 Pos. Light, 2 motor.	A. C. polarized	Replaced manual block
Central Region	...	10.0	Altoona, Pa.	Gallitzin	32	Grade signal aspect		To permit tonnage freights to pass automatic signals.
	...	21.6	Conemaugh, Pa.	Gallitzin	50	Grade signal aspect		
U. Pacific	...	34.8	Leroy, Wyo.	Wahsatch, Utah	143	U. S. & S., Style B. L. O., 2-pos.		Two-arm home and dist., without overlaps.
L. A. & S. Lake	2.6	...	Crestmore, Calif.	Ormand	2	U. S. & S.	Line control	Absolute staff, hand operated.
O. S. L.	...	...	Various Points		27	Motor semaphore	Neutral	Added to existing installation, for new passing tracks.
St. Louis-S. Fran.	...	6.8	Eureka	Pacific	15			S. T. changed to D. T.
	...	9.2	Sleeper	W. Lebanon	20			S. T. changed to D. T.
	...	4.3	Globe	Monett	10			S. T. changed to D. T.
	...	9.6	Olathe	Spring Hill				S. T. changed to D. T.
S. Pacific:								
Texas & La. Lines	...	2.0	El Paso, Tex.	Rio Grande R.	6	Union Style B.	Neutral track and polarized line	D. C., L. O.
	...	0.7	Englewood, Tex.	Baer Jct.	6	Union Style B.		
Pacific System	6.3	...	Hornberg, Ore.	Gregory, Ore.	22	Union		
	10.3	...	Portland, Ore.	Beaverton	19	Light		A. C., color.
					31	Union		Color light.
Wash., Balt. & An.	18.2	...						
W. Maryland	2.4	...	Williamsport, Md.	Pinesburg	9	Union Style S.	Track	U. O., 3-pos. Change from single to double track.
Totals	349.5	264.7			1,336			

[1] Interboro R. T. Co., New York.—On three-track lines the inside track is signaled for both directions; outer (local) tracks, signaled only at curves. Electro-pneumatic stops at signal locations.

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION ON DECEMBER 31, 1921

Name of road	Miles of road: Single track	Miles of road: Double track	From	To	No. of signals	Type of signals	Control system	Remarks
B. & Ohio	...	10.0	Wildwood, Pa.	Pine Creek	22	Union, Style T-2		
C. & Ohio	40.0	...	Charlottesville	Staunton	88	Union light	Line A. P. B.	Color light.
C. & Alton	...	4.0	Manchester, Ill.	Roodhouse	2		Track	2-pos. L. O.
Ill. Central	...	3.5	Paducah, Ky.	Yards	11	Hall, Style L.	Overlap	
Interborough R. T.	...	3.7	143d Street	Fordham Rd.	53	Color-light		On suburban line; three-track
D. & Hudson	13.0	...	Schenevus, N. Y.	E. Worcester	14	Motor semaphore	Track and line	U. O., 3-pos., normal danger.
Pennsylvania:								
Eastern Region	...	15.0	Atglen	Downingtown	57	General; pos. light	A. C. polarized	Fourt track; replace electro-pneumatic and motor.
	...	19.4	Egg Harbor	Atlantic City	39	Union pos. light	D. C. polarized	Approach lighting.
M., K. & T.	56.5	...	Vinita, Okla.	Wybark	87	Union, Style S, U. O.	Automatic	Approach electric lights.
	7.0	...	Lamar, Tex.	Buna	11	Union, Style S, U. O.	A. P. B.	Approach electric lights.
W. Pacific	2.8	...	Niles, Calif.		5	Union, Style B		D. C., 3-pos., U. O.
Totals	119.3	55.6			389			

TABLE C—AUTOMATIC BLOCK SIGNALS—PROPOSED NEW CONSTRUCTION

Name of road	Miles of road: Single track	Miles of road: Double track	From	To	No. of signals	Type of signals	Control system	Remarks
A. T. & S. F.	...	10.2	Nerska, Ill.	Willow Sps., Ill	13	Union, Style T-2	Neutral track	
	...	8.9	New Boston, Mo.	Dumas, Mo.	12	Union, Style T-2	Neutral track	
	...	23.9	Olathe, Kan.	Le Loup, Kan.	25	Union, Style T-2	Neutral track	
	...	14.6	Neva, Kan.	Cedar Pt., Kan.	28	Union, Style T-2	Neutral track	
	6.8	...	Walton, Kan.	Newton, Kan.	2	Union, Style T-2	Neutral track	
Canadian Nat.								
Eastern Lines	4.0	6.0	Sevis	Chandiere	24		A. P. B. on S. T.	
	26.0	...	Sackville	Springhill	54		A. P. B.	
C. & O.	4.0	...	Stollings, W. Va.	Rum Creek Jct.	3		A. P. B.	
C. & A.	...	6.0	Godfrey, Ill.	Brighton	4	Motor semaphore	Track circuit	2-pos., L. O.
Great Northern	165.0	...						
Ill. Traction Co.	16.0	...	Staunton, Ill.	Edwardsville	37	Motor semaphore	Track circuit	
N. P.	155.0	48	Dilworth, Minn.	Mandan, N. D.	378	G. R. S., Model 2A, 3-pos.	A.P.B. on single track.	
	...	68	Garrison, Mont.	Missoula	..			Change from D. C. to A. C. track circuits.
Pacific Electric	...	3.0	Indian Village	Sierra Vista	20	Color light		Four track.
Pennsylvania:								
Central Region	...	18.3	Ingram	Bulger	87	Position light	Track and line	
	...	6.8	Collier, W. Va.	Wheeling Jct.	45	Position light	Track and line	
	...	21.9	Jewett, O.	Dennison, O.	90	Position light	Track and line	
W. P.	1.2	...	Marysville		5	Union, Style B.	A. C. track circuit	D. C. operated.
Totals	378.0	235.6			749			

TABLE D—MANUAL BLOCK SIGNALING INSTALLED IN 1921

Name of road	Miles of road Single track	Miles of road Double track	From	To	No. of signals	Type of signal
Can. Nat'l:						
East Lines	...	..	Joffre			
C. & N. W.	61	..	New Ulm, Minn.	Tracy	9	2-pos. L.Q.
Ft. Worth & D. C.	141	..	Wichita Falls, Tex.	Ft. Worth	16	2-arm
St. Louis-S. F.	7.8	..	Marion	Train staff	..	.....
				.....	5	.....
Total	...	209.8		.....	30	.....

TABLE G—INTERLOCKING PLANTS COMPLETED IN 1921

Name of road	Location	Layout crossing, junction, terminal, etc.	Number of working levers: Mechanical	Electrical	Electro pneumatic
A. T. & S. F.	Newkirk, Okla.	Junction	..	15	..
A. C. L.	Allenhurst, Ga.	Crossing	6[a]	..	..
B. & O.	Tates Point, O.	Crossing	34	..	..
Boston & Maine	So. Lawrence, Mass.	Enginehouse	24	..	..
Can. Nat'l:					
East Lines	Joliette	Crossing	13[1]	..	..
	Washago, Ont.	Draw	12	..	..
	North Bay, Ont.	Crossing	5[2]	..	..
G. T. Pacific	Saskatoon	Crossing	9[3]	..	..
	Saskatoon	Crossing	5[3]	..	..
C. P.	Watson, Sask.	Crossing C. N. R.	13	..	..
C. R. R. of N. J.	Phillipsburg, N. J.	Xing & Junction.	..	..	45[b]
C. & O.	Big Sandy Jct., Ky.	Junction	5	5[c]	..
C. & N. W.	Hurley, Wis.	Junction	8	..	..
C. C. C. & St. L.	Burt-Galion, Ohio	Xing & Junction.	50	12[d]	..
	Ansonia, Ohio	Xing C. N. Div.	41	10[d]	..
	Briar (Acton, Ind.)	End Double Track	10	6[d]	..
	Beech Grove, Ind.	Terminal	10	7[d]	..
	Winchester, Ind.	Xing, G. R. & I.	32	10[d]	..
	Greenville, Ohio	Xing, D. & U.	14	..	..
D. L. & W.	Hackensack	Drawbridge	..	4	11[e]
	Kearney	Junction	..	4	11[e]
	Harrison Yard	Switches	..	7	15[e]
	Newark, N. J.	Begin Third Track	..	5	8[e]
	Newark, N. J.	Drawbridge	8	..	..
Erie	Newark, N. J.	Drawbridge	..	11	..
I. C.	Ramsey, Ill.	Crossing	29	..	..
G. N.	Carlton, Minn.	Xing & Junction.	..	57	..
G. T.:					
Western Lines	Pontiac, Mich.	Crossing	..	22[f]	..
	Pontiac, Mich.	Crossing	13[f]	..	..
	Battle Creek, Mich.	Crossing[g]	..	..	..
K. C. Southern	De Queen, Ark.	Crossing	12[h]	..	..
	Worland, Mo.	Crossing	13[h]	..	..
Pacific Electric	Wisburn, Calif.	Crossing	8[i]	..	..
Pennsylvania:					
S. W. Region.	Richmond, Ind.	Switching	..	44[j]	..
Eastern Region.	Canton, Md.	Crossing	15[k]	..	..
P. & R.	Myerstown, Pa.	Switching	..	23	..
L. & N.	Mayton, Tenn.	Junction	8[l]	..	..
	Brentwood, Tenn.	Junction	4[m]	..	..
	Biloxi, Miss.	Drawbridge	8[n]	..	..
M. K. & T.	Ft. Worth, Tex.	Yards, Crossing.	23[p]	..	..
N. Y. C.	Rotterdam Jct.	Junction	50[q]	..	..
Michig'n Cent'l.	Detroit, Charlevoix St.	Crossing	..	16	..
	Detroit, Buchanan St.	Crossing	7	..	5
	Detroit, Palmer Ave.	Crossing	..	10	..
N. Y. N. H. & H.	Providence, R. I.	Hump Yard	..	..	23[r]
	New Haven, Conn.	Hump Yard	..	..	36[r]
	New Haven, Conn.	Terminal Yard	12	..	..
N. Pacific	Sauk Center, Minn.	Crossing & J'ct'n	8[s]	..	..
	Belgrade, Mont.		2	..	..
Southern	Tenbridge, Tenn.	Drawbridge	..	..	7[t]
	Warrior River, Ala.	Drawbridge	..	..	6[t]
	Demopolis, Ala.	Crossing	3[u]	..	..
S. Pacific:					
Texas & La.	El Paso, Tex.	Junction	7[v]	..	..
	El Paso, Tex.	Crossing	3[w]	..	..
	Englewood, Tex.	Junction & Yard	5[w]	..	..
T. St. L. & W.	Ramsey, Ill.	Crossing	29	..	..
U. P.:					
O. S. L.	Salt Lake City	Terminal	..	..	4[x]
Total	59		558	232	197

[1] Rebuilding only.
[2] Addition.
[3] Additions.
[a] Door-locked.
[b] A. C. track circuits.
[c] Union electro-mechanical.
[d] Electro-mechanical machine; detector and route locking.
[e] Switches electro-pneumatic; signals 4-unit color-light; D. C. track circuits, route locking and check locking between towers; all functions a. c. control.
[f] Trolley contact controls locking on electric line.
[g] Four electric signals controlled by clock-work time-release operated by gate tender.
[h] Detector circuits; power distant signals.
[i] A. C. track circuits on P. E.; d. c. on Santa Fe. Time locks and power signals.
[j] G. R. S. electric; route and detector locking; position-light dwarf signals.
[k] Electro-mechanical; position-light signals.
[l] Temporary.
[m] Table lever.
[n] Electro-mechanical; rebuilt.
[p] Approach and detector locking.
[q] Renewal; route and approach locking.
[r] U. S. & S. push-button.
[s] Addition to existing machine.
[t] G. R. S. electric; Model 2.
[u] Ground lever.
[v] Approach and detector locking.
[w] Approach, detector and route locking.
[x] Levers added.

TABLE H—INTERLOCKING PLANTS UNDER CONSTRUCTION DECEMBER 31, 1921

Name of road	Location	Layout crossing, junction or terminal	No. of working levers: Mechanical	Electrical	Electro pneumatic	Total
A. C. L.	Ashley River	Drawbridge	4	..	..	4[a]
B. & O.	M't'n L'ke P., Md.	Junction	43	..	..	43[a]
Boston & Maine	Concord, N. H.	Enginehouse	..	6	..	6
C. & O.	Hint., W.V. (MX).	Terminal	9	11	..	20[b]
D. & H.	Scholarie, Jct.	Junction	..	25	..	25[c]
I. C.	W. Waterloo, Ia.	Crossing	15	..	..	15
Interboro R. T.	180 D Street		..	..	44	44
	New Lots Ave.		..	..	10	10
Grand Trunk:						
Western Lines.	Pontiac, Mich.	Crossing	24	..	..	24[d]
	Detroit, Mich.	Crossing	18	..	..	18[d]
Pennsylv. System:						
Eastern Region.	Caln, Pa.	Switching	..	..	18	18[e]
	Parkesburg, Pa.	Switching	..	..	27	27[e]
	Thorndale, Pa.	Switching	..	..	21	21[e]
	Coatesville, Pa.	Switching	27	..	..	27[e]
Lehigh & N. E.	Bath, Pa.	Cross. D. L. & W.	6	..	..	6[f]
	Nazareth, Pa.	Cross. D. L. & W.	5	..	..	5[f]
N. Y. Central	Syracuse Jt., N. Y.	Junction	35	..	..	35[g]
	Finch, N. Y.	Crossing	20	..	..	20[h]
U. Pacific	Aspen, Wyo.	Tunnel, & E. D. T.	..	20	..	20[i]
	Altamont, Wyo.	Tunnel, & E. D. T.	..	21	..	21[j]
	Coun. B'ffs, Ia., A.	Terminal & Jct.	..	12	..	12[k]
	Coun. B'ffs, Ia., B.	Terminal & Jct.	..	16	..	16[l]
Wabash	Detroit, Mich.	Draw. and Jct. D. T. & I.	..	10	..	10[m]
W. Pacific	San Jose	Crossing	17	..	..	17
Total	24		223	121	120	464

[a] Electro-mechanical.
[b] Federal; electro-mechanical.
[c] Electric; concrete trunking.
[d] Trolley contactor controls locking on electric line.
[e] Reconstruction; position-light signals replace semaphores.
[f] Power signals; electric time locks.
[g] Renewal; route and approach locking.
[h] Route locking.
[i] G. R. S., model 2A; check locking through tunnel.
[j] G. R. S., model 2A; check locking through tunnel.
[k] Added to G. R. S., model 2.
[l] U. S. & S.; style F.
[m] Union, D C., type F.

TABLE I—INTERLOCKING PLANTS PROPOSED FOR 1922

Name of road	Location	Layout crossing, junction or terminal	No. of working levers: Mechanical	Electrical	Electro pneumatic	Total
Can. Nat'l.:						
East Lines	Charny, P. Q.	Junction	..	16	..	16
	Tweed	Crossing		Rebuilding		
	St. Cloud	Crossing		Rebuilding		
	Harrowsmith	Crossing	20	..	..	20
	Washago	Junction	21	..	..	21
	Allenby Jct.	Crossing	5[c]	..	..	5
G. T. Pacific	North Edmonton.	Crossing & Jct.	40[g]	..	..	40
	Alix	Crossing & Jct.	..	8[h]	..	8
	Portage La Prairie	Crossing to be rebuilt				
A. C. L.	Boydville, Ga.	Crossing	6	..	..	6[a]
C. & O.	Cincinnati, Ohio.	Terminal	..	..	28	28
	St. Albans, W. Va.	Junction	8	19	..	27
C. & E. I.		Crossing	16	..	..	16
Grand Trunk:						
Western Lines.	Charlotte, Mich.	Crossing	..	22	..	22
Interboro R. T.	240th Street		..	..	52	52
	Jerome Ave.	Yard	..	..	50	50
	New Lots Ave.	Yard	..	..	32	32
M. K. & T.	Hallett, Okla.	Crossing	12	..	..	12[b]
	Mound City, Kan.	Crossing	18	..	..	18[b]
Kansas City So.		Crossing	13	..	..	13
		Crossing	13	..	..	13
		Crossing	14	..	..	14
Pacific Electric	Neitos, Calif.	Crossing	15	..	..	15[c]
	Sierra Vista, Calif.	Junction	..	56	..	56[d]
P. & R.	Essington, Pa.	Drawbridge	2	5	..	7
	Atlantic City, N.J.	Drawbridge	10	19	..	29
	Allentown, Pa.	Junction	..	..	53	53
	Harrisburg, Pa.	Junction	..	..	42	42
	Schuylkill Haven.	Switching	35	..	..	35
W. Pacific	San Jose, Calif.	Crossing	20	..	..	20
Totals	30		268	145	257	670

[a] Door locked.
[b] Approach and detector locking.
[c] A. C. track circuits on P. E. and d. c. on Santa Fe; detector locking.
[d] Approach and detector locking.
[f] Addition
[g] Route and approved locking; 3 pos. distant signals.
[h] Adding 8 electric levers to mechanical plant. Route and approved locking. Outlying switch operated by low voltage machine.

THE GREAT NORTHERN has tendered to the department of public works, of the state of Washington, its right of way from Northport, Wash., to the Canadian line, a distance of about 10 miles, for conversion into a public highway. The line includes a bridge across the Columbia river, which cost about a half million dollars.

Railroad Telegraph and Telephone Activities

Construction a Minimum in 1921—Considerable Increased Use of Composite Circuits

By J. H. Dunn

A Heavy Wire Lead

PRELIMINARY to making this second annual survey of the activities in the railroad telegraph and telephone field, the *Railway Age* sent questionnaires to 214 representative roads asking for certain data with reference to their outside plant equipment. As this feature of our annual review number was only inaugurated last year it is difficult to draw any comparisons with the amounts of work done in previous years. However, it is evident that construction has been at a minimum during 1921.

Small Amount of Work Completed in 1921

Thirty-one of 115 roads replying reported telegraph and telephone construction work completed during 1921. Of the 393 miles of railroad-owned pole line built in the United States, the Louisville & Nashville constructed 237 miles, and the Nashville, Chattanooga & St. Louis 135 miles, both installations being replacements of equipment removed because of the termination of contracts with the Western Union. The Canadian National installed 158.4 miles of pole line, 1,637.2 miles of iron wire and 2,998 miles of copper. The reports show that 1,190.4 miles of iron wire was installed and 1,104.9 miles of copper was added to existing plant equipment in the United States.

Some 913 miles of road was equipped with telephone train dispatching circuits, the largest installation being that of 489 miles on the Western Pacific Railroad. A total of 244 miles of metallic telephone circuits for block signaling was placed in service and 1,689 miles of metallic message and conversation circuits was installed; the largest installation was 518 miles on the Lehigh & New England and the second largest, 454 miles on the Chicago, Burlington & Quincy.

It is interesting to note that only 24.4 miles of telegraph dispatching circuits have been reported as installed during 1921, whereas telephone train dispatching circuits were placed in service on 913 miles of road during this period. The tendency to utilize existing wires to the limit is shown by the installation of 1,269.6 miles of simplex circuits, 336.6 miles of duplex and 842 miles of phantom.

Some Work Under Construction

The amount of cable construction was limited, the largest installation of overhead cable for telegraph purposes being 10 miles on the Chicago, Burlington & Quincy. Twenty-two miles of overhead cable was installed for electrical transmission on the New York Central. Eighty-two telephone booths or boxes were reported placed in service during the year 1921.

Thirteen roads reported work under construction as of December 31, 1921. Only 68 miles of pole line is reported as under way, 33.2 miles of this being on the Western Pacific and 18 miles on the Canadian National. The installation of 531.4 miles of iron wire and 2,506.4 miles of copper is now under way. Construction work under way also includes 49.3 road miles of telegraph dispatching circuits and 183 miles of telephone dispatching.

The total of circuit miles of telephone equipment reported under construction includes 131 miles of metallic dispatching, 128.8 miles of metallic block, and 70 miles of message and conversation circuits. A total of 2.9 miles of overhead cable and 3 miles of underground cable is under construction at this time.

MINIMUM amount of construction in recent years, thus taxing existing facilities to the limit. Many important developments have been made in apparatus, placing the roads in a position to expand their facilities to better advantage at this time. Pole line maintenance is from two to five years behind schedule.

Widespread application of telephones for train dispatching and long distance conversation circuits is an important part of contemplated construction program.

Work Contemplated for 1922

As budgets have been held up or cancelled so often in the past few years a number of roads refuse to offer an estimate of the future construction activities. However, it is illuminating to note that in spite of adverse conditions considerable telegraph and telephone work is planned, and authority for commencement of work has been granted in several cases.

Only 60 miles of pole line is contemplated on the 25 roads reporting new work. However, it is the intention to add 700 miles of iron wire and 7,409 miles of copper. Definite plans are under way for the addition of telegraph train dispatching circuits on nine different roads, the largest proposed installation being that of 453 miles on the Ft. Worth & Denver City. Metallic conversation circuits to the extent of 2,798 miles are contemplated, 1,418 miles of which is on the Pennsylvania, southwestern region.

General Outlook

The amount of telegraph and telephone construction on the railroads during 1921 will no doubt stand as one of the lowest records. In contrast to this, it is interesting to note that over 50 per cent of the officers in charge of the telegraph departments indicated in their reports that the prospect for new work in 1922 is hopeful; and some few have definite authority to proceed.

On many railroads the maintenance of pole lines has been, of necessity, somewhat neglected during the past few

TABLE I—TELEGRAPH AND TELEPHONE WORK COMPLETED IN NINETEEN TWENTY-ONE

Name of road	Total miles of pole line owned exclusively by railroad: Telegraph	Signal and electrical: Transmission	Signal and electrical: Service	Pole line owned jointly by R. R. and telegraph co.: Miles	Miles used jointly by signal department	Total miles of wire owned by railroad, ½ of joint wires included: Telegraph and telephone: Iron	Telegraph and telephone: Copper	Signal and electrical: Transmission	Signal and electrical: Service	Road miles operated by railroad	Road miles dispatched by telegraph	Road miles dispatched by telephone	Road miles of automatic block	Road miles of manual block
Canadian National	158	...	...	...	...	1,637.0	2,998.0	...	...	...	...	...	...	...
B. & Ohio	...	...	...	...	...	98.8	...	...	...	...	...	...	...	...
B. & L. Erie	...	...	...	...	...	...	90	...	...	...	...	...	...	...
C., B. & Quincy	...	...	...	...	...	126	...	...	...	...	...	...	...	...
C. & Ohio	...	...	...	...	...	...	...	...	...	...	...	...	...	...
D. M. & Northern	...	...	...	...	...	...	...	...	...	...	...	...	...	...
D. & Hudson	20	...	...	...	...	...	...	...	...	20	...	20	...	...
D., L. & Western	...	...	...	...	...	...	169	...	...	...	...	...	...	...
D. & I. Range	...	15	...	...	...	...	...	...	...	...	...	...	...	...
Florida East Coast	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ill. Central	...	...	...	...	...	...	...	...	...	...	...	68.6	...	...
Gulf, Mobile & N.	...	...	...	...	...	83	...	...	...	...	...	...	...	...
N. Y. Central	...	...	...	...	...	...	122	...	...	...	...	...	...	...
M. C.	...	...	...	...	...	...	150	...	...	...	...	...	...	...
L. E. & Western	...	...	...	...	...	...	37	...	...	...	...	37	...	...
L. Valley	...	...	...	...	...	...	180	...	...	...	...	...	...	...
L. & Nashville	237	...	...	...	...	536	...	...	...	...	...	...	...	...
Lehigh & N. E.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M., K. & T.	...	...	55	...	...	...	...	..	275	...	...	...	55	...
Munising, Marquette & S. E.	...	...	...	...	...	72.2	...	...	...	...	...	...	...	...
N. Pacific	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. C. & St. Louis	135	...	...	...	...	162	633	...	...	...	...	135	...	...
N. Y., N. H & H.	1	...	...	...	...	...	...	...	...	...	...	...	...	...
P. & Reading	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Pennsylvania, Central Region	...	...	...	...	...	...	46.4	...	4.1	...	...	...	...	...
Southern Pacific	...	...	...	...	...	...	444	...	...	...	...	156	...	...
Lines in Texas	...	...	...	...	...	...	...	...	...	...	...	...	...	...
U. Pacific	...	...	...	14.1	...	15.2	...	...	...	14.1	6.4	7.7	...	...
O. W. R. R. & N.	...	...	...	...	...	4.3	37.5	...	...	...	...	...	...	...
O. S. L.	...	...	...	...	...	12	...	...	...	...	...	...	...	...
Western Maryland	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Western Pacific	...	...	...	18	...	...	18	...	...	18	18	489	...	...
Totals	551	15	55	32.1	...	2,746.4	4,802.9	...	279.1	52.1	24.4	913.3	55	...

Name of road	Circuit miles of telephone circuits railroad owned: Metallic dispatching	Metallic block	Metallic conversation or message	Yard circuits, all kinds	Grounded dispatching	Total miles of superimposed circuits: Simplex	Composite	Phantom	Telegraph circuits: No. duplex	No. quad	No. printer	Telegraph offices: Gen. office and relay	Division or terminal	Way station	Telephone offices: Telephone block	Telephone booth	Miles of cable in line exclusive of drops to offices and signals, etc.: Telegraph service: Overhead	Telegraph service: Underground	Signal and electrical: Overhead	Signal and electrical: Underground
Canadian National	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B. & Ohio	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B. & L. Erie	...	...	90	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
C. B. & Quincy	...	165	454	5	...	165	187	104	...	...	...	...	...	...	...	25	10	...	...	...
C. & Ohio	...	...	120	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
D. M. & Northern	...	...	1.5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
D. & Hudson	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...
D., L. & Western	...	...	84.9	...	6.4	...	133	...	76	...	...	...	...	...	...	...	...	...	...	...
D. & I. Range	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Florida East Coast	...	...	...	...	...	696	...	...	...	...	...	...	...	...	...	4	...	...	...	...
Ill. Central	75.7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gulf Mobile & N.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. Y. Central	...	...	26	25	...	140	...	...	3	1	...	...	...	...	2	12	2	2	22	...
M. C.	...	...	75	...	...	75	...	...	1	...	...	...	...	...	...	...	1.9	.5	...	...
L. E. & Western	...	37	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.2	...	...
L. Valley	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
L. & Nashville	18.6	...	518	...	...	...	...	...	...	...	...	...	...	...	...	...	0.6	...	...	...
Lehigh & N. E.	...	...	...	6.4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M. K. & Tex.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Munising, Marquette & S. E.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. Pacific	...	...	...	...	...	...	...	341	...	...	...	...	...	...	...	...	...	...	...	0.2
N. C. & St. Louis	178	42	135	...	...	135	...	135	...	...	...	...	...	...	...	...	...	...	...	...
N. Y., N. H. & H.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
P. & Reading	...	...	1.5	...	...	58.6	2.5	78.1	...	...	...	...	...	...	...	...	...	...	...	...
Pennsylvania Central Region	...	...	15.2	...	...	...	...	101.6	...	...	...	...	...	...	...	...	...	...	...	...
Southern Pacific	...	...	131	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lines in Texas	483	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
U. Pacific	7.7	...	...	2.8	...	...	14.1	...	...	...	...	...	...	1	...	2	...	...	...	...
O. W. R. R. & N.	...	...	17	1.1	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...	..
O. S. L.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...
Western Maryland	...	...	...	...	...	...	...	83	...	...	...	...	...	...	...	...	...	...	...	...
Western Pacific	979	...	...	...	...	...	...	...	...	...	...	...	...	2	...	32	...	...	...	...
Totals	1,762	244	1,669.1	40.3	6.4	1,269.6	336.6	842.7	80	1	...	...	...	3	2	82	19.5	2.7	22	0.2

years. Of the 22 roads estimating the status of their maintenance programs four roads consider that this work is from four to five years behind schedule, ten roads are from six months to two years back and eight roads report their maintenance up to date. Evidently there must be considerable reconstruction of pole lines in the near future in order to maintain satisfactory service. About 26,000 miles of wire is considered as a minimum to meet the requirements of these 22 roads within the near future.

Several roads evidently prefer automatic printers for long distance message service with the telephone for block and local work. Of the 32 roads reporting on the item, 17 indicate that telephone train dispatching circuits are to be installed as soon as conditions permit.

TABLE 2—TELEGRAPH AND TELEPHONE WORK UNDER CONSTRUCTION ON DECEMBER 31, 1921

Name of road	Total miles of pole line owned exclusively by railroad: Telegraph	Signal and electrical: Transmission	Signal and electrical: Service	Pole line owned jointly by R. R. and telegraph co.: Miles	Miles used jointly by signal department	Total miles of wire owned by railroad, ½ of joint wires included: Telegraph and telephone: Iron	Telegraph and telephone: Copper	Signal and electrical: Transmission	Signal and electrical: Service	Road miles operated by railroad	Road miles dispatched by telegraph	Road miles dispatched by telephone	Road miles of automatic block	Road miles of manual block
Canadian National	18	...	...	...	...	432.0	1,760.0	...	...	...	...	...	...	...
D. & H.	...	...	...	...	...	...	...	...	...	...	...	...	13	...
D., L. & W.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grand Trunk	...	...	...	...	...	...	366	...	...	...	...	183	...	...
Illinois Traction	...	...	...	...	...	66	...	...	...	...	...	...	...	...
L. & Nashville	5	...	...	...	...	10	...	...	...	...	...	...	...	...
Lehigh & Hudson R.	...	...	...	...	...	...	174	...	...	...	...	...	...	...
N. Y. Central	...	...	...	...	...	...	24	...	...	...	...	...	...	...
N. Pacific	...	...	...	...	...	...	...	...	...	...	...	...	...	...
P. & Reading	...	...	...	...	...	...	128.8	...	...	...	...	...	...	...
M., K. & Texas	...	...	55	...	...	...	...	...	275	...	...	...	55	...
Western Pacific	...	...	...	33.2	...	16.6	...	...	...	33	33	...	...	...
U. Pacific	...	...	...	16.3	...	6.8	17	...	...	16.3	16.3	...	...	...
L. A. & St. L.	...	...	...	...	...	...	37	...	...	...	...	...	...	...
Totals	23	...	55	49.5	...	531.4	2,508.8	...	275	49.3	49.3	183	68	...

Name of road	Circuit miles of telephone circuits railroad owned: Metallic dispatching	Metallic block	Metallic conversation or message	Yard circuits, all kinds	Grounded dispatching	Total miles of superimposed circuits: Simplex	Composite	Phantom	Telegraph circuits: No. duplex	No. quad	No. printer	Telegraph offices: Gen. office and relay	Division or terminal	Way station	Telephone offices: Telephone block	Telephone booth	Miles of cable in line exclusive of drops to offices and signals, etc.: Telegraph service: Overhead	Telegraph service: Underground	Signal and electrical: Overhead	Signal and electrical: Underground
Canadian National	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
D. & H.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
D., L. & W.	...	...	...	...	...	...	...	68	...	...	...	...	...	...	...	...	...	...	...	...
Grand Trunk	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Illinois Traction	33	...	33	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
L. & Nashville	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lehigh & Hud. R.	87	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. Y. Central	...	...	...	12	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...
N. Pacific	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2.6	0.5	...	...
P. & Reading	...	128.8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0.3	1.3	...	...
M. K. & Texas	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Western Pacific	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	2	...	...	...	...
U. Pacific	...	...	...	...	...	...	16.3	...	...	...	...	...	...	2	...	...	...	1.7	...	...
L. A. & S. L.	...	...	37	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Totals	131	128.8	70	12	...	...	16.3	68	...	...	...	2	2	3	...	2	2.9	3.5	...	...

TABLE 3—TELEGRAPH AND TELEPHONE WORK CONTEMPLATED FOR NINETEEN TWENTY-TWO

TABLE CONTINUED ON NEXT PAGE

Name of road	Total miles of pole line owned exclusively by railroad: Telegraph	Signal and electrical: Transmission	Signal and electrical: Service	Pole line owned jointly by R. R. and telegraph co.: Miles	Miles used jointly by signal department	Total miles of wire owned by railroad, ½ of joint wires included: Telegraph and telephone: Iron	Telegraph and telephone: Copper	Signal and electrical: Transmission	Signal and electrical: Service	Road miles operated by railroad	Road miles dispatched by telegraph	Road miles dispatched by telephone	Road miles of automatic block	Road miles of manual block
Chi., Rock Is'd & Pacific	...	...	...	...	...	...	...	...	...	...	...	...	...	...
C. & Ohio	25	...	...	...	...	...	...	...	...	...	...	...	...	...
Colorado & S.	...	...	...	...	...	...	...	...	...	...	...	232	...	...
D., L. & W.	...	...	...	...	...	...	117	...	...	...	...	...	...	...
Ft. Worth & D. C.	...	...	...	...	...	...	...	...	...	...	...	453	...	...
Florida East Coast	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grand Trunk	...	...	...	...	...	22	862	...	...	...	...	431	...	...
K. C. Southern	...	...	...	...	...	...	129	...	...	...	...	...	...	...
Lehigh & N. E.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. Y. Central	...	...	...	...	...	...	560	...	...	...	...	...	...	...
P. & L. Erie	...	...	...	3.3	...	...	6.6	...	...	...	...	...	...	...
N. C. & St. Louis	...	...	...	...	...	...	...	...	...	...	...	247	...	...
N. Pacific	...	...	...	...	...	...	229	...	...	...	...	...	...	...
P. & Reading	...	...	...	...	...	...	189.8	...	...	...	...	94.9	...	...
Pennsylvania:														
Southwest Region	...	...	...	...	...	136	2,836	...	...	...	...	123	...	...
Central Region	...	...	...	7.4	...	...	438.4	...	15	5	...	14.8	...	...
Rich'd F. & Potomac	...	...	...	...	...	...	...	...	...	...	...	...	...	...
S. Pacific:														
Lines in Texas	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wabash	...	...	...	...	...	...	...	...	...	...	...	...	...	...
U. Pacific	...	...	...	25.2	...	255	224	...	...	13.2	...	127	...	...
O. S. L.	...	...	...	...	...	...	267	...	...	...	...	111.2	...	...
O. W. R. & N.	...	...	...	...	...	281	629	...	...	...	...	229	...	...
L. A. & St. L.	...	...	...	...	...	...	918	...	...	...	...	...	...	...
Totals	25	...	...	35.9	...	694	7,405.8	...	15	18.2	...	2,062.9	...	...

TELEGRAPH AND TELEPHONE WORK CONTEMPLATED FOR 1922—Continued

Name of road	Circuit miles of telephone circuits railroad owned: Metallic dispatching	Metallic block	Metallic conversation or message	Yard circuits, all kinds	Grounded dispatching	Total miles of superimposed circuits: Simplex	Composite	Phantom	Telegraph circuits: No. duplex	No. quad	No. printer	Telegraph offices: Gen. office and relay	Division or terminal	Way station	Telephone offices: Telephone block	Telephone booth	Miles of cable in line exclusive of drops to offices and signals, etc.: Telegraph service: Overhead	Telegraph service: Underground	Signal and electrical: Overhead	Signal and electrical: Underground
Chi., Rock Is'd & Pacific	75.0	...	...	...	...	75.0	...	...	...	...	...	...	...	...	...	...	...	...	...	...
C. & Ohio	...	...	147	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Colorado & S.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
D., L. & W.	...	...	58.5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ft. Worth & D. C.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Florida East Coast	...	...	...	...	...	156	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grand Trunk	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
K. C. Southern	...	...	129	...	...	129	...	...	...	...	...	...	...	...	17	11	...	...	...	...
Lehigh & N. F.	...	...	26.2	...	...	...	...	19.6	...	...	...	...	...	...	...	...	...	...	...	...
N. Y. Central	...	...	280	20	...	297	...	297	1	1	...	...	...	...	...	50	...	...	...	...
P. & L. Erie	...	...	...	6.6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
N. C. & St. Louis	...	...	247	...	...	229	...	229	...	...	...	...	...	...	...	...	...	...	...	...
N. Pacific	...	...	...	...	...	...	394	394	1	...	...	...	...	...	...	...	...	...	...	...
P. & Reading	189.8	...	...	...	...	64.4	...	55	...	...	...	...	...	...	35	22	...	...	...	...
Pennsylvania:																				
Southwest Region	123	...	1,418	...	...	1,042	...	55	8	...	...	...	...	...	...	...	1	...	...	...
Central Region	14.8	35.4	310	...	...	419	...	160	...	...	...	...	...	...	...	...	...	...	...	...
Rich'd F. & Potomac	...	...	...	...	...	...	...	116.0	...	...	...	...	...	...	...	...	...	...	...	...
S. Pacific:																				
Lines in Texas	382	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wabash	350	...	...	...	...	...	100	...	2	...	...	...	...	...	...	...	...	...	...	...
U. Pacific	103	...	...	...	...	...	...	13.2	...	...	...	...	2	1	...	26	0.2	5	...	...
O. S. L.	133	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	...	...	...	...
O. W. R. & N.	229	...	183	...	...	190.9	...	190.9	...	...	...	...	...	...	...	28	...	...	...	...
L. A. & S. L.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Totals	1,662.6	35.4	2,798.7	26.6	...	2,602.3	494	1,529.7	12	1	...	...	2	1	52	148	1.2	5	...	...

Recent developments of the telephone repeater have removed the limit from long distance telephone communication. Late experiments on electrified roads have demonstrated the success of the carrier current system of communication over the trolley wire to or from a moving train. In certain congested districts or in localities where the physical conditions prevent the economical construction of a pole line, it is evident that wireless telegraph and telephone apparatus will produce economies, and railroad installations of this nature are being watched with interest.

An Analysis of the Railway Statistics for 1921

(*Continued from page* 123)

rates in the near future undoubtedly dammed up the current of traffic to some extent near the close of 1921—a condition which in the public interest should not be allowed to extend many weeks into the year.

The Coming Year

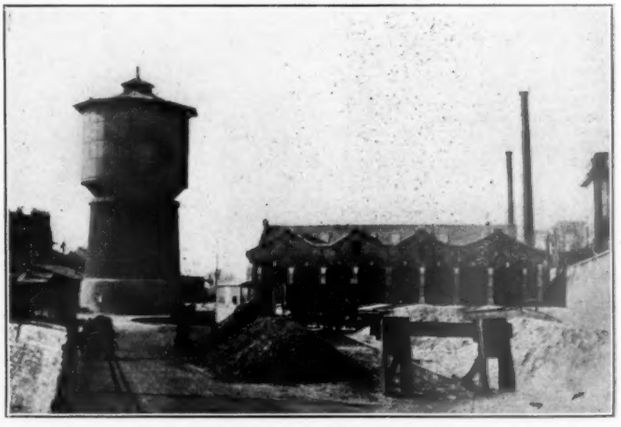
Three elements of uncertainty exist in the railway situation as it will project itself into the 12 months of 1922, namely, the level of rates, the level of wages, and the level of traffic.

The rate question is now under investigation by the Interstate Commerce Commission, in the form of a general inquiry into the subject. That the Commission appreciates the vital importance—not only to the railways themselves, but to the whole business world as well—of moving promptly in this matter is clear from the record already made in the inquiry, and a speedy decision in the matter may be expected with confidence.

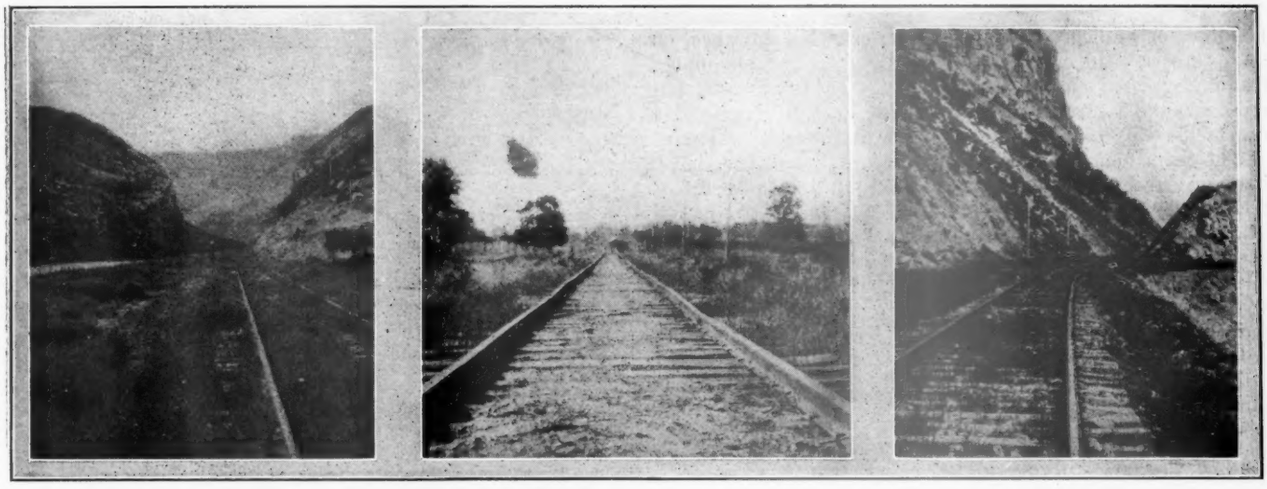
The wage question will shortly come before the Railroad Labor Board, on appeal from virtually all the railways and in respect to virtually all classes of employees. The complexity of the issues involved is so great that a decision may not be reached so promptly as in the matter of rates, but that the question will be thoroughly examined in 1922, and that a determination of some sort will be reached, seems beyond cavil.

What the traffic will be in 1922 is a matter of conjecture, of course, but I feel that we may expect an improvement over 1921 much more confidently than we may anticipate a reduction either in rates or wages. A tone of optimism pervades the business world which is not wholly psychological, but is based on actualities, and in any general improvement in business the railways are bound to share. The effect of even a 10 per cent increase in traffic would be most heartening, and would translate itself into a real improvement in the financial position of the railways.

Without venturing even a guess as to the rate and wage probabilities, therefore, I strongly believe in a better railway year for 1922 than we experienced in 1921.



Engine House and Water Tower at Lausanne, Switzerland



Some Typical Views of Abandoned Lines

Railway Lines Abandoned During the Year 1921

Difficulties Facing Roads Through the Year Clearly Indicated by Mileage Discontinued

By Milburn Moore

THE YEAR 1921 was one of the most difficult, from practically every angle, that the railways of the United States have had to face in, perhaps, their entire history. By the first of the year it had become fairly evident that many of the roads were going to have a serious struggle if they were to come through without disturbing financial troubles, if not bankruptcy. It is not surprising, then, that operation was suspended or discontinued on 1,626.38 miles of line. To this amount there should be added 51 miles of line upon which operation was suspended or discontinued altogether during the latter part of 1920, notice of which was received too late to be included in the last annual compilation of statistics. This brings the total up to 1,677.38 miles, or over a thousand miles more than were constructed in about the same period.

Of the total mileage abandoned for operation, 217.09 miles, or slightly less than the corresponding figure for 1920, were abandoned entirely, the track being taken up and the equipment sold. A large part of the remaining 1,460.29 miles consisted of lines upon which operation was discontinued because of conditions peculiar to the year, such as light traffic and heavy operating expenses. It is not unlikely that some of this mileage will again be placed in service when conditions become more favorable.

The past year is the first full year in which it has been necessary for the Interstate Commerce Commission to decide whether the "present and future public convenience and necessity permit the abandonment" of railway lines. It has reported upon a large number of cases during the year. This introduces another point of interest in connection with lines abandoned which helps to give a clearer picture of the year's changes. It concerns the applications for abandonment presented to the commission, which are not included in the main compilation of miles abandoned, etc. In addition to the 1,677.38 miles mentioned, there were authorizations by the commission for the discontinuance of 191.01 miles and applications for the abandonment of 575.17 miles, regarding which no action has as yet been reported publicly.

With the exception of a few states, the major portion of the mileage upon which operation has been discontinued, plus the mileage included in the applications before the commission, lies in the southern states from coast to coast, with Arkansas outstanding, with about 223 miles upon which track was taken up or operation discontinued.

Of the entire country, the state of Colorado suffered the most, including, as it did, practically one-fourth of the total miles abandoned for the country. Some of the more important roads of this state which are no longer operating are the Colorado Midland and the Colorado Springs & Cripple Creek District.

The mileage for Michigan was high also and is represented almost entirely by short sections and small branches of the Pere Marquette of which only a small part has been abandoned to date, the remainder being covered by applications before the commission and not yet authorized.

The largest of the roads which found it impossible to keep its wheels turning was the Missouri & North Arkansas and the experience of this road and the cause for the cessation of operation is but a repetition of the story of light traffic and heavy operating expenses.

Some of the smaller lines which have ceased operation because of their unprofitableness and their ability to run up large deficits as common carriers, and which show little justification for resumption of operation as common carriers, do contain some possibilities as private lines or plant facilities. An example of this is the Sugar Pine Railway, which was released during 1921 by both the California Railroad Commission and the Interstate Commerce Commission as a common carrier but which is now being operated under lease by a large lumber company as a plant facility.

While there is a reasonable possibility that some of these roads will again resume operation under more favorable circumstances, there is considerable mileage which is more likely to be discontinued permanently and the lines junked. It is an interesting fact that much of the mileage abandoned, or to be abandoned for operation shortly, was constructed primarily for logging purposes and, so long as the timber held out and the market was good, they were a profitable investment. With the removal of most of the timber, there has not been sufficient traffic to justify the continuation of

the lines or branches as common carriers. For instance, on one southern road only three carloads of other than lumber traffic originated on the line during the entire year. It has only taken the severity of a year like 1921 to hasten to a conclusion what would have been the outcome anyway.

The permanent abandonments of the past few years have, in a way, been indicative of the gradual tightening up of the country's railway lines and the consequent elimination of the lines that are poorly and uneconomically located, without any particular hardship to the surrounding territory. Although 1921 was the fifth year that the miles of line abandoned exceeded the miles of new line constructed, this fact cannot be construed as meaning that the country is overbuilt with railways. In fact, there is still need for much railway construction and the clearing away of these lines should in the end prove beneficial, if not even stimulating, when there is more money available and the subject of extensions to existing lines and the building of new ones is once again under consideration.

United States	Lines abandoned permanently and taken up, Miles	Lines abandoned and not taken up, Miles
Adirondack & St. Lawrence	.....	7.00
Ashley, Drew & Northern—		
Near Ozmont, Ark.	0.85	1.46
Ashland, Odonah & Marengo—		
Odonah, Wis., to end of track	20.00	.....
Atchison, Topeka & Santa Fe—		
Barnwell, Calif., to South Ivanpah	8.34	.....
Atlanta & St. Andrew's Bay—		
St. Andrew's branch in Florida	.....	2.64
Bennettsville & Cheraw—		
Brownsville, S. C., to Sellers	.....	10.44
Big Falls Railway—		
In Wisconsin, not specified	.....	10.00
Boston & Maine—		
Bethlehem Junction, N. H., to Profile House.	.....	8.33
Cherry Mountain, N. H., to Jefferson	.....	3.49
Profile House, N. H., north	1.14	.....
Caro Northern—		
In Texas	.....	17.00
Central New England—		
Feeding Hills, Mass., to Agawam Junction	1.90	.....
Charlotte Harbor & Northern—		
Tiger Bay branch in Florida	.....	9.00
Colorado Midland—		
In Colorado	.....	338.00
Colorado Springs & Cripple Creek District—		
In Colorado	.....	71.00
Delta Southern—		
Percy, Miss., to Richey	.....	10.45
Elizabeth, Miss., to Kerg's Junction	.....	14.47
Itta Bene, Miss., to Belzoni	.....	27.19
Georgia & Florida—		
In Georgia	2.80	.....
Great Northern—		
In Chisholm, Minn.	0.51	.....
Greenville & Northern—		
In Texas	.....	11.83
Gulf, Mobile & Northern—		
Ellisville, Miss., to Ellisville Junction	6.56	.....
Hawkinsville & Florida Southern—		
Hawkinsville, Ga., to Worth	.....	42.33
Ashburn, Ga., to Camella	.....	49.93
Jonesboro, Lake City & Eastern—		
McFerren, Ark., to Osceola	9.42	.....
Midway, Ark., to Luxora	1.60	.....
Kentwood, Greensburg & Southwestern—		
Kent's Mill, La., to Freiler	.....	13.21
Lake Charles Railway & Navigation—		
Louisiana	.....	12.00
Leesville East & West—		
From Leesville, La., east	10.00	.....
Leetonia Railway—		
Leetonia, Pa., to Cushman Junction	12.17	.....
Lehigh & New England—		
In New York	0.77	.....
Lehigh Valley—		
End of Andover branch	0.22	.....
Little Rock, Maumelle & Western—		
Becker, Ark., to Coal Springs	25.00	.....
Louisiana & Northwest—		
Natchitoches, La., to Chestnut	22.00	.....
Memphis, Dallas & Gulf	.....	154.00
Middle Tennessee—		
Franklin, Tenn., to Mt. Pleasant	.....	44.50
Midland & Northwestern—		
Midland, Tex., to Seminole	.....	65.14
Missouri & North Arkansas	.....	365.00
Missouri, Kansas & Texas—		
In Oklahoma City, Okla.	.....	2.17
New Orleans—Great Northern—		
Pearl River, La., to Hill's Switch	3.55	.....
St. Tammany, La., to Florenville	3.43	.....
Northeast Oklahoma—		
In Oklahoma	0.66	.....
Northern Pacific—		
Berndt, Minn., to Bayne	1.87	.....
Oregon, Washington Railroad & Navigation—		
Pritchard, Idaho, to Paragon	.....	11.25
Pacific Electric—		
In Long Beach, Calif.	1.12	.....
Panama Railroad—		
Las Cascadas, Canal Zone, to Pontoon Bridge	.....	6.34
Bas Obispo to Las Cascadas	2.00	.....
Pearl River Valley—		
In Mississippi	2.62	.....
Pere Marquette—		
Rapid City, Mich., to Kalkaska	11.40	.....
Clary, Mich., to Carters	4.45	.....
Philadelphia & Reading—		
Near Shamokin, Pa.	0.31	.....
Potatoe Creek Railroad—		
Keating Summit, Pa., to four-mile post	4.00	.....
Reynoldsville & Falls Creek—		
Rathmel Junction, Pa., to David Mine	1.37	.....
St. Louis & Ohio River—		
Reebs Station, Ill., to Belleville	.....	2.00
St. Louis Southwestern—		
Lufkin, Tex., to Kennard	.....	30.30
Shreveport, Alexandria & Southwestern—		
Longville, La., to Vandercook	.....	5.50
Sugar Pine Railway—		
In California	.....	14.15
Texas & Pacific—		
In Dallas, Tex.	0.72	.....
Texas, Arkansas & Louisiana	7.70	.....
Union Pacific—		
Evanston, Wyo., to state line	3.53	.....
Wyuta, Utah, to Wahsatch	1.84	.....
Union Traction—		
In Summitville, Ind.	0.52	0.37
Valdosta, Moultrie & Western—		
Valdosta, Ga., to Moultrie	42.00	.....
Watauga & Yadkin River—		
In North Carolina	.....	30.50
Wisconsin-Northwestern—		
In Wisconsin	.....	18.30
Yakima Valley Transportation Company—		
In Yakima, Wash.	0.72	.....
	217.09	1,409.29
Canada		
Alberta & Great Waterways—		
In Alberta	11.40	.....
Great Northern—		
In vicinity of Cloverdale, B. C.	0.90	.....
International boundary to Rossland, B. C.	.....	9.47
	12.30	9.47

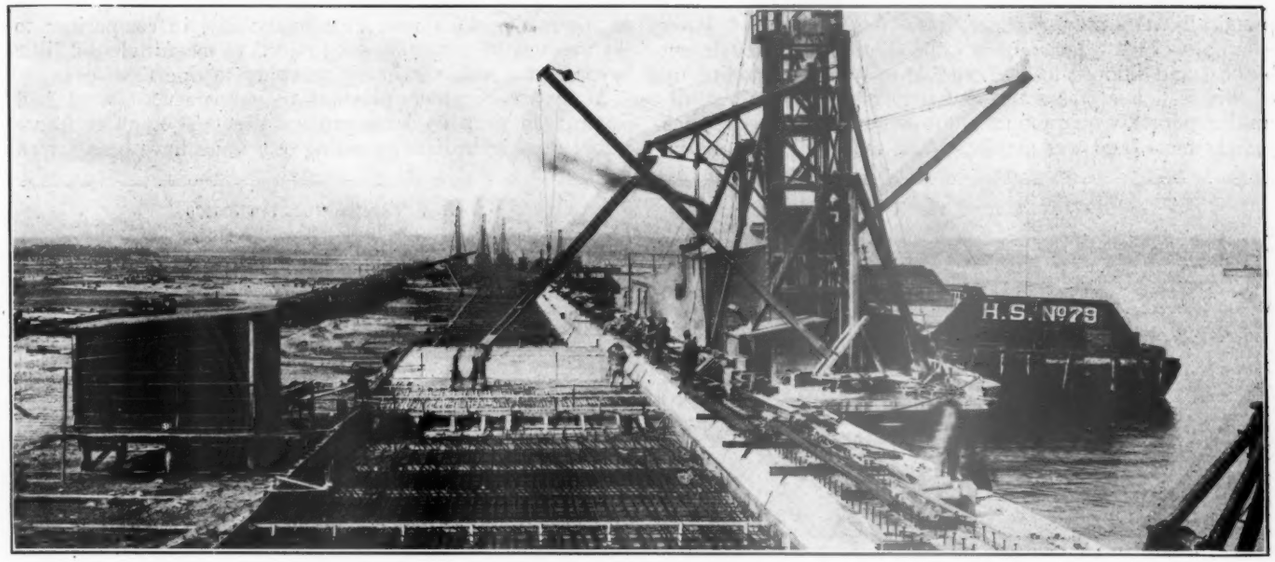
LINES NOT INCLUDED IN 1920 STATISTICS

United States	Lines abandoned permanently and taken up, Miles	Lines abandoned and not taken up, Miles
Bucksport & Elk River	.....	8.00
Crystal River & San Juan—		
In Colorado	.....	11.00
Cumberland Northern—		
In Tennessee	.....	10.00
Newport & Sherman's Valley—		
In Pennsylvania	.....	22.00
	.....	51.00

APPLICATIONS MADE TO ABANDON, DURING 1921

Railroad	Applied for, miles	Authorized, miles
Alabama & Mississippi—		
Vinegar Bend, Ala., to Pascagoula	.....	67.00
Atchison, Topeka & Santa Fe—		
Burnett branch, Okla.	.....	4.67
Bangor & Aroostook—		
Brownsville Junction, Me., to Catahdin Iron Works	9.40	.....
Chicago & Eastern Illinois—		
Chicago & Indiana Coal Railway	179.41	.....
Colorado Southern—		
Buena Vista, Colo., to Romley	.....	29.42
Duluth & Northern Minnesota—		
Knife River, Minn., to Cascade	99.25*	.....
Flint Belt (Pere Marquette)—		
Genesee County, Mich.	13.50	.....
Franklin & Pittsylvania—		
Rocky Mount, Va., to Pittsville	29.90	.....
Green Bay & Western—		
Onalaska, Wis., to La Crosse	6.00†	.....
Great Northern—		
Branch in Steven's County, Wash.	.....	7.49
Portland, N. Dak., to Portland Junction	.....	3.50
Kinder & Northwestern—		
Kinder, La., to Bullard	.....	16.00
Liberty-White—		
Liberty, Miss., to South Macomb	.....	24.20
Liveoak, Perry & Gulf—		
In Taylor County, Fla.	.....	2.00
Minneapolis, St. Paul & Sault St. Marie—		
Ironhub, Minn., to Deerwood	3.90	.....
Mississippi Central—		
Branch line from Hattiesburg, Miss.	.....	11.74
Northern Pacific—		
Washburn branch in Wisconsin	33.78	.....
Boulder-Elkhorn branch in Minnesota	19.60	.....
Norfolk Southern—		
Carthage, N. C., to Pinehurst	12.20	.....
Patterson & Western—		
Patterson, Calif., to Jones Station	.....	23.60
Pere Marquette—		
Freeport branch in Michigan	6.23	.....
Benton Harbor, Mich., to Buchanan	25.69	.....
Haynor, Mich., to Sheridan	19.64	.....
Big Rapids, Mich., to White Cloud	19.67	.....
Harrison, Mich., to Leota	10.00	.....
Seaboard Air Line—		
In Nassau County, Fla.	.....	1.39
Tennessee, Alabama & Georgia	88.00‡	.....
Totals	575.17	191.01

*Authorized to abandon, but case recently reopened.
†Authority refused.
‡Application made to Federal court.



The Claremont Terminal of the Lehigh Valley

Not Much Activity in New Construction in 1921

Mileage of New Lines Shows Increase Over 1920, but Other Projects Were Small and Restricted

By Milburn Moore

ONE ENCOURAGING FEATURE of a most difficult year for the railroads was the greater activity in the building of new lines in the United States. During 1921 there were completed 475.10 miles of new line, which in comparison to the low record for 1920 of 313.71 miles is an increase of about 45 per cent. It is, however, far below the mileages built previous to the World War and from about two-thirds to one-half of that built each year during the four years previous to 1920.

Total mileage (first, second and other multiple main track) also increased, reaching 642.22 miles, of which 143.07 and 25.26 miles were second and third track respectively. This multiple track construction is an encouraging increase over 1920 when but 414.35 miles of all track were completed, of which 90.87 and 1.89 miles were second and third track. Other railway construction was concerned almost entirely with the completion of a few large projects and a number of small ones started in previous years. Little new work of any size was inaugurated during 1921.

In Canada there was a considerable decrease in total mileage constructed as compared with 1920 and almost no building of second and other multiple track work. With 251.48 miles of first track and 6.57 miles of second, Canadian mileage came close to its low record of 1918. Since 1914 the building of new lines in Canada has been at a low point and it is doubtful whether there will be much done in the future until Canada gets nearer a solution of her railway problem.

The longest stretch of line was that constructed by the Government Railroad of Alaska—81.95 miles. This marks the completion of the building program of the Alaskan project as it now stands and no new construction in the way of additional mileage is in progress. It is expected that the Government Railroad of Alaska will be formally opened to operation with elaborate ceremonies at Anchorage early in February. The remaining first track mileage was, in the main, divided approximately among seven states, with Texas leading with 63.60 miles and Florida next with 59.90 miles. The other states which had any considerable mileage of first track, comparatively speaking, were North Carolina with 48 miles, Oklahoma with 44.92 miles and West Virginia with 44.90 miles. West Virginia also had 21.52 miles of second track or a total of 66.42 miles, the greatest mileage of all track constructed within any one state.

The most important reason for West Virginia's track expansion is the development of that state's coal territories much of which has not, as yet, even been tapped. The growth of coal traffic has in some instances been far greater than the expansion of railway facilities to handle it. This is particularly true of the Chesapeake & Ohio during the past few years and, of the 21.52 miles of new second track, 18.8 miles are the work of that road in carrying out its plan of double-tracking the line up the Guyandot river into the Logan coal fields. The completion of these 18.8 miles in addition to what has already been finished makes this line 50 per cent double track.

The development in Texas, with a total mileage of 65.77 is, in a manner, similar, if oil be considered instead of coal. Each year sees an expansion of the oil field activities in that state with an accompanying need for more railway facilities.

Florida with 59.90 miles, all first track as stated previously, is the result of entirely different needs, which are presumably not that of expansion because of commercial necessity in a direct sense, but rather an expansion to fill pioneering agricultural needs. Florida for its size is one of the least, if not the least, developed of the states from a railway standpoint. Immense tracts of land are as yet idle and unsettled. The drainage work in and around the Everglades made available a considerable acreage of rich land, with a consequent growth of towns and settlements, the further growth of which was dependent upon transportation. It is only a few years ago when the principal and, in fact,

practically the only product from this section of lower Florida, was catfish, caught in Lake Okeechobee, brought out by boat and shipped to St. Louis, Mo. With the opening up of this section of the state, a variety of important agricultural products were produced, the quantity increasing each year as more land was developed and more settlers came in.

of the roads which were able financially, in comparison to the average, to carry forward projects of magnitude did little beyond what was absolutely necessary to tide them over.

Many roads which previous to government control had commenced work on large projects designed to effect future rather than immediate operating economies have been forced

NEW TRACK BUILT IN 1921

United States	Number companies building	Miles: First track	Second track	Third track	Fourth or more track	Total
Alaska	1	81.95	....	....	....	81.95
Arkansas	4	13.59	2.00	....	....	15.59
California	4	5.27	1.19	....	....	6.46
Florida	4	59.90	....	....	....	59.90
Georgia	2	4.80	....	....	....	4.80
Hawaii	1	10.00	....	....	....	10.00
Idaho	1	7.54	....	....	....	7.54
Illinois	1	....	3.30	....	....	3.30
Indiana	2	4.77	33.80	....	....	38.57
Kansas	2	0.75	9.65	....	....	10.40
Kentucky	3	1.57	5.50	10.60	....	17.67
Louisiana	1	7.81	....	....	....	7.81
Maryland	1	....	2.30	....	....	2.30
Minnesota	1	3.00	....	....	....	3.00
Mississippi	3	7.90	0.80	....	....	8.70
Missouri	4	4.09	8.77	0.06	0.11	13.03
Montana	1	....	2.90	....	....	2.90
Nebraska	1	14.06	....	....	....	14.06
New Jersey	1	1.90	....	....	....	1.90
New York	1	....	....	13.30	....	13.30
North Carolina	2	48.00	....	....	....	48.00
Ohio	2	....	8.85	0.95	0.68	10.48
Oklahoma	5	44.92	....	....	....	44.92
Pennsylvania	3	5.52	....	0.35	....	5.87
Tennessee	1	6.00	....	....	....	6.00
Texas	4	63.60	2.17	....	....	65.77
Utah	3	12.82	11.19	....	....	24.01
Washington	1	3.50	....	....	....	3.50
West Virginia	5	44.90	21.52	....	....	66.42
Wyoming	1	16.94	29.13	....	....	46.07
Total	66	475.10	143.07	25.26	0.79	642.22
Canada	19	151.28	6.57	....	....	157.85

NEW TRACK BUILT IN 1920

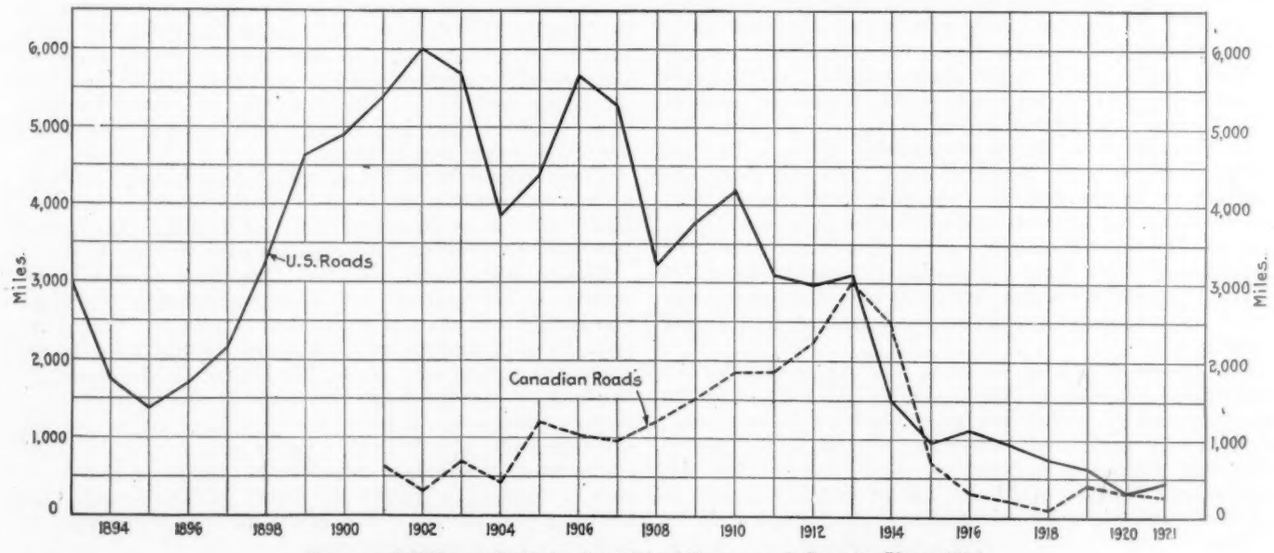
United States—	No. Cos. building	Miles: First track	Second track	Third track	Fourth or more track	Total
Alaska	1	37.00	....	....	....	37.00
Arizona	1	5.00	....	....	....	5.00
Arkansas	2	9.00	....	....	....	9.00
California	5	54.74	....	....	....	54.74
Colorado	1	....	1.10	....	....	1.10
Florida	2	12.20	....	....	....	12.20
Georgia	2	5.00	....	....	....	5.00
Illinois	1	2.00	36.54	....	....	38.54
Kansas	1	0.50	....	....	....	0.50
Kentucky	4	19.87	....	1.80	....	21.67
Louisiana	3	31.15	....	....	....	31.15
Maryland	1	2.72	....	....	....	2.72
Michigan	1	....	0.50	....	....	0.50
Mississippi	1	9.52	....	....	....	9.52
Missouri	2	0.86	11.85	....	....	12.71
New Jersey	2	1.97	2.24	....	1.74	5.95
New Mexico	1	9.00	....	....	....	9.00
New York	1	1.46	1.46	....	....	2.92
Ohio	1	1.35	27.24	0.09	5.99	34.67
Oklahoma	2	18.00	....	....	....	18.00
Oregon	4	8.60	....	....	....	8.60
Pennsylvania	4	6.12	0.39	....	0.15	6.66
Tennessee	1	2.50	....	....	....	2.50
Texas	3	54.90	1.70	....	....	56.60
Utah	1	3.60	....	....	....	3.60
Virginia	1	0.20	....	....	....	0.20
West Virginia	3	16.45	1.75	....	....	18.20
Wisconsin	1	....	6.10	....	....	6.10
Total	53	313.71	90.87	1.89	7.88	414.35
Canada	7	305.39	31.60	....	....	336.99

This Florida work, like that in Alaska, resembles somewhat the railway development in the pioneer days of the past.

In general, the year's construction has but emphasized what was indicated strongly last year, namely, that intensive development was more imperative than extensive and that any money to be spent must necessarily be spent along those lines. That has kept such building as there was strictly to projects which would improve the operation of trains at a minimum of expense. The marked decrease in traffic at the beginning of 1921, the heavy operating expenses, the state of general business, and numerous other factors created undoubtedly an uncertainty as to the outcome of the railway year financially that caused much needed work to be held up pending the return of more stable conditions. Even many

either to curtail the work greatly or to abandon temporarily all work. A notable example of this case is the Pennsylvania, which during the past three or four years has had a large number of projects under way involving the expenditure of millions of dollars, yet only a small part of it has ever been completed and nothing was carried forward during 1921 except the building of one line in West Virginia to be about 12.66 miles long when completed.

A substantial proportion of the projects listed this year under the different roads are small ones covering improvements to engine terminal and yard facilities, an indication, in itself, of the direction which construction took for the year. Among the few large projects upon which work was performed in 1921 there is only one which may be said to have



Curves of Mileage Built in the United States and Canada Since 1893

been started during that period. This project is the grade separation work of the Delaware, Lackawanna & Western through East Orange, N. J. The remainder consists of work carried over or continued, examples of which are the Claremont terminal of the Lehigh Valley, and the St. Paul, Minn., union passenger station. In general, good progress has been made on these and the other few large items.

At the close of the year there are some factors which look encouraging for 1922. One of these is the apparent revival of the building of branch lines, extensions and even new short lines. Many of the items show references to lines either under survey or projected and, in other instances, under construction. Traffic is tending to increase and expenses have decreased; general business is on the upgrade and the prices of materials and labor are tending to grow less, all of which are important and controlling influences on the amount of construction which can be done in the future. Nearly all the roads have much work in prospect, which is vital to their future—how much of it will be done is, of course, practically dependent altogether on 1922 earnings. As the prospects for increased net returns look brighter, there are hopes for a healthier construction year in 1922.

Railroad Construction in the United States in 1921

Ahukini Terminal & Railway

First Track: From Ahukini, Kanaii, to Kealia, Kanaii, in territory of Hawaii, 10 miles.

Other Important Work Under Construction: New line under survey from Kealia to Moloaa, 10 miles. Construction of breakwater across mouth of Bay at Ahukini, cost $100,000, 50 per cent completed. Building reinforced concrete wharf at Ahukini, cost $150,000, completed.

Americus & Atlantic

First Track: In Georgia, not specified, 2 miles.

Other Important Work Under Construction: Surveys made for new lines from Horns Siding, Ga., to Americus, 11 miles.

Ashley, Drew & Northern

First Track: In Arkansas, not specified, 2.23 miles.

Other Important Work Under Construction: Building in the vicinity of Ozmont and Fountain Prairie, Ark., 2.31 miles.

Atchison, Topeka & Santa Fe

Second Track: At San Bernadino, Calif., 2.91 miles.

Other Work Under Construction: New power house at Albuquerque, N. Mex., cost $100,000, 15 per cent completed. Machine shop and facilities at Albuquerque, $1,200,000, 98 per cent completed. Extension to Alvasado hotel, Albuquerque, cost $400,000, contract awarded.

Atlantic & Carolina

First Track: From Kenansville, N. C., to Chinquapin, 13 miles.

Atlantic Coast Line

First Track: From Goodno, Fla., to Immokalee, 25.8 miles.

Baltimore & Ohio

Other Important Work Under Construction: Renewal of tunnel roof at Philadelphia, Pa., cost $275,000, completed. Construction of two joint industrial tracks in Philadelphia, Pa., cost $260,000, 65 per cent completed. Track elevation through South Philadelphia, and east side yard to the Delaware river, $1,000,000 initial appropriation, 20 per cent completed. Extension of third track and connection, etc., at Bay View Junction, Md., cost $113,000, 50 per cent completed. Revision of Locust Point, Md., branch and yard, cost $795,000, completed. Building new yard at Mt. Winans, Md., cost $700,000, completed. Renewal of bridges at Savage and College, Md., cost $118,000, 50 per cent completed. New shop facilities, Cumberland, Md., cost $120,000, completed. Bridge renewals at Mt. Savage Junction to Ellerlie, Pa., cost $308,900, completed. Renewal of bridge at Pittsburgh, Pa., over Allegheny river, cost $3,475,350, completed. Bridge renewal at Clokey and Washington, Pa., cost $117,000, 40 per cent completed. Bridge renewal at Foxburg, Pa., cost $125,000, completed. Bridge renewal at W. Alexander to Elm Grove, W. Va., cost $126,000, 50 per cent completed. Construction of branch industrial line and revision of branch line, Norton, W. Va., cost $235,000, completed. Track revision from Grafton to Fairmont, W. Va., cost $135,000, completed. Renewal of bridge over Hocking river at Guysville, Ohio, cost $253,200, completed. Rebuilding bridge over Great Miami river at Lawrenceburg, Ind., cost $2,197,000, completed. Renewal of bridge at Rossford, Ohio, cost $110,000, completed. Side track for industrial development at Defiance, Ohio, cost $238,000, 55 per cent completed.

Bartlett Western

Other Important Work Under Construction: Survey of new line from Bartlett, Tex., to Cameron, 32 miles.

Bessemer & Lake Erie

Other Important Work Under Construction: Conversion of Culmerville tunnel into an open cut, with relocation of highways and bridges, Culmerville, Pa., cost $300,000, 15 per cent completed.

Boston & Maine

Other Important Work Under Construction: New 28-stall engine house and other engine terminal facilities at Concord, N. H., $1,065,000, 50 per cent completed. Strengthening bridge over Merrimac river, Newburyport, Mass., cost $405,200. Additional tracks and extension of existing tracks at Rotterdam, N. Y., cost $261,000, 90 per cent completed. Renewal of messenger wires in electric zone at Hoosac Tunnel, Mass., cost $120,000, completed.

Central of Georgia

Other Important Work Under Construction: Building from McCombs, Ala., to Overton, 6.78 miles; new engine terminal, including concrete engine house and repair shop, turntable, etc., at Columbus, Ga., cost $500,000, completed.

Central of New Jersey

First Track: From Bridgeton Junction, N. J., to Seabrook Farms, 1.9 miles.

Other Important Work Under Construction: Renewal of bridge 214, East Rahway, N. J., cost $450,000, 99 per cent completed; bridge 217, Maurer, N. J., cost $312,000, 99 per cent completed. Construction of a new bridge over Delaware river at Easton, Pa., and the widening of another bridge including track changes and interlocking, cost $1,118,647, 99 per cent completed. Renewal of bridge 58 at Coalport, Pa., cost $500,000, 10 per cent completed.

Central Pacific

Other Important Work Under Construction: General store building and oil storehouse at Sacramento, Calif., cost $210,000, completed. Additional ferry slip and roadway for additional ferry service between Oakland Pier and San Francisco, cost $121,700, completed.

Chesapeake & Ohio

First Track: From Mud Junction, W. Va., to Argonne, 3.3 miles. From Whitman Junction, W. Va., to Whitman, 0.8 mile; from Edwight, W. Va., to end of line, 1.8 miles. From Cow Creek, W. Va., to Conley Creek, 2 miles. From Stirrat, W. Va., to Little Creek, 1 mile.

Second Track: From Clover Valley, W. Va., to Salt Rock, 10.1 miles. From Big Creek, W. Va., to Pecks Mills, 8.7 miles.

Third Track: From Big Sandy Junction, Ky., to Russell, 10.6 miles.

Other Important Work Under Construction: Building new line from Wylo, W. Va., up Elk Creek, 3 miles. New line under survey from Olive Hill to Russell, Ky., 40 miles. Extension of 11 tracks in eastbound yard and new westbound yard at Gladstone, Va., cost $400,936, completed. Installation of automatic train control, Charlottesville to Staunton, Va., cost $248,649, 26 per cent completed. Improvements to shops, etc., at Clifton Forge, Va., cost $837,600, 95 per cent completed. New eastbound yard at Hinton, W. Va., cost $342,300, completed. Change of grade and line at St. Albans to Ferrell, W. Va., cost $1,402,325, 99 per cent completed. New engine-dispatching and yard tracks at Peach Creek, W. Va., cost $368,580, 86 per cent completed. New water station at Stevens, Ky., cost $173,000, completed. New freight station at Logan, W. Va., cost $150,000, completed. Renewal of bridge over Licking river at Covington, Ky., cost $296,500, sub-structure 99 per cent completed. New engine house, boiler washing plant, etc., at Ashland, Ky., cost $170,000, installation of turntable only completed.

Chicago & Alton

Second Track: Nilwood, Ill., to Bierd, 3.3 miles.

Other Important Work Under Construction: Large freight terminal and office building at Chicago, cost $3,000,000, 98 per cent completed.

Chicago, Burlington & Quincy

Other Important Work Under Construction: Elevation and realinement of main tracks through Aurora, Ill., to Montgomery, cost $5,000,000, 80 per cent completed. Additional yard tracks, roundhouse, power plants, etc., at Centralia, Ill., cost $600,000, completed.

Chicago, Indianapolis & Louisville

Other Important Work Under Construction: Freight car repair shop at Lafayette, Ind., cost $160,000, completed.

Chicago, Milwaukee & St. Paul

Other Important Work Under Construction: Renewal of Skykomish river crossing, Monroe, Wash., cost $141,780, completed. Renewal of Ebey Slough draw near Everett, Wash., cost $102,639, 40 per cent completed. Renewal of Snohomish river draw, near Everett, Wash., cost $191,169, 80 per cent completed.

Chicago, Rock Island & Pacific

Second Track: Little Rock, Ark., to Biddle, 2 miles.

Other Important Work Under Construction: Three-story brick office building at Chicago, cost $100,000, completed.

Cleveland, Cincinnati, Chicago & St. Louis

First Track: In vicinity of Zionsville, Ind., 4.5 miles.

Second Track: Augusta, Ind., to Whitestown, 10.2 miles; Briar, Ind., to Beech Grove, 9 miles; Winchester, Ind., to Farmland, 8.6 miles; Templeton, Ind., to Swanington, 6 miles.

Other Important Work Under Construction: Engine terminal and facilities at Ansonia, Ohio, cost $177,000, 30 per cent completed. Engine terminal at Sheff, Ind., cost $198,000, 30 per cent completed. Grade reduction from Templeton to Swanington, Ind., cost $635,000, 90 per cent completed.

Cowlitz, Chehalis & Cascade

First Track: From Lacamas, Wash., east, 3.5 miles.

Delaware & Hudson

Third Track: From Schenevus, N. Y., to Summit, 13.3 miles.

Delaware, Lackawanna & Western

Other Important Work Under Construction: Track elevation and grade separation work at East Orange, N. J., including the enlargement of two passenger stations and the construction of two new ones, cost $4,000,000, 35 per cent completed. The elimination of two grade crossings at Paterson, N. J., cost $100,000, 60 per cent completed. Elimination of one grade crossing at Mountain Lakes, N. J., $125,000, 50 per cent completed. Changing present third track on Hackensack meadows from slow freight to high-speed passenger track in connection with substitution of color signals for semaphore signals on lines between Harrison, Newark and Hackensack river, cost $483,479, 95 per cent completed. Elimination of grade crossings, near Cortland, N. Y., cost $104,000, 75 per cent completed.

De Queen & Eastern

First Track: From Oklahoma-Arkansas state line to De Queen, Ark., 8.86 miles.

East Erie Commercial

Other Important Work Under Construction: Building connection in Pennsylvania, 0.65 mile; grade separation work, cost $125,000, 99 per cent completed.

East Texas & Gulf

First Track: Hyatt, Tex., to Wurtsbaugh, 9.6 miles.
Other Important Work Under Construction: A line projected from Hyatt, Tex., to Hicks, 7.8 miles.

Erie Railroad

Other Important Work Under Construction: Renewal of drawbridge over Passaic river at Newark, N. J., 98 per cent completed.

Galesburg, Rockford & Northern

Other Important Work Under Construction: New lines from Hooppole, Ill., to Geneseo, 15.98 miles under survey; 85 per cent of the right-of-way secured.

Galveston, Harrisburg & San Antonio

Second Track: In Texas, from mile post 829.26 to 832.03, 2.17 miles.

Genesee & Wyoming

Other Important Work Under Construction: New classification yard and track at Retsof, N. Y., cost $200,000, 30 per cent completed.

Georgia & Florida

First Track: In Georgia, mile post 224 to 226¼—2.25 miles; mile post 234¾ to 234.3—0.55 mile.
Other Important Work Under Construction: Building from mile post 227 to mile post 237—10 miles. From Padgetts, Ga., to Allene, 2.08 miles. New line under survey, 2.75 miles.

Goshen Valley

First Track: Dividend, Utah, to Pearl Junction, 11 miles.

Government Railroad of Alaska

First Track: In Alaska, 81.95 miles.
Other Important Work Under Construction: Construction of a modern coal washing plant at Sutton, Alaska, cost $600,000, 65 per cent completed.

Great Northern Railway

Other Important Work Under Construction: The construction of outer half of ore dock and renewal of pile and trestle approach to another ore dock at Allouez, Wis., cost $1,558,000, completed. Construction of new highways on each side of Grand View cut to eliminate several bridges at Vancouver, B. C., cost $156,800, 50 per cent completed. Renewal of draw span over Snohomish river and new foundations, cost $260,000, to be completed in 1922. Widening under-crossings and renewal of steel bridge at Como and Tenth avenue, Minneapolis, Minn., cost $160,400, completed. Grade separation and construction of steel and concrete bridge at East Hennepin avenue, Minneapolis, Minn., cost $411,700, completed.

Gulf Coast Lines

First Track: From Albert, La., to Jefferson Island, 7.81 miles.
Other Important Work Under Construction: Rebuilding and enlarging shops, etc., at Kingsville, Tex., cost $100,000, completed.

Hocking Valley

Second Track: Marion, Ohio, to Morral, 8.85 miles.

Indianapolis Union Railway

Other Important Work Under Construction: Grade separation work at Indianapolis, Ind., cost $9,000,000, 90 per cent completed.

Interstate Railroad

Other Important Work Under Construction: Building new tracks from Norton, Va., to mouth of Guest river, 16 miles, and from mouth of Guest river to Miller yard in Virginia, 1.9 miles. Machine shop and foundry at Andover, Va., cost $100,000, completed.

Jackson & Eastern

First Track: From Sebastopool, Miss., to Horseshoe, 5.5 miles.
Other Important Work Under Construction: Building from Horseshoe, Miss., to Walnut Grove, 3.9 miles. Surveyed and under project from Walnut Grove to Jackson, 51.7 miles.

Jonesboro, Lake City & Eastern

First Track: Victoria, Ark., to Golden Lake, 2.5 miles.

Kanawha & Michigan

Other Important Work Under Construction: Building low grade northbound line for through freight service from Hobsen, Ohio, to Meigs, 5.5 miles, cost $677,000, 66 per cent completed.

Kansas & Oklahoma

First Track: In Oklahoma, near Forgan, 1 mile. In Kansas, near Liberal, 0.75 mile.

Kansas City Terminal

Third Track: In Kansas City, Mo., 0.06 mile.
Fourth Track: In Kansas City, Mo., 0.11 mile.
Other Important Work Under Construction: Steel and concrete viaduct at Holmes street, cost $261,000, 60 per cent completed. Structural steel and reinforced concrete viaduct at Seventh street, over yards and tracks, cost $400,000.

Kentucky & Tennessee

First Track: Stearns, Ky., to Gregory, 1.57 miles.

Lehigh Valley

Other Important Work Under Construction: Building of first unit of a new rail and deep-water terminal, also dredging a 35-ft. channel to deep water at Claremont, Jersey City, N. J., 65 per cent completed. One-story pier and bulkhead for merchandise freight on East river, New York City, completed.

Lewiston, Nezperce & Eastern

Other Important Work Under Construction: Building from Tammany, Ida., to Waha, 11 miles.

Liveoak, Perry & Gulf

First Track: In Florida, not specified, 4 miles.

Los Angeles & Salt Lake

Other Important Work Under Construction: Building machine shop and equipment at Provo, Utah, $227,110, completed. Construction of reinforced concrete addition to tank car repair shop with necessary machinery and trackage at Los Angeles, Calif., cost $315,198, completed. Building new freight terminal at Long Beach, Calif., cost $195,000, 38 per cent completed. Construction new freight terminal at Los Angeles, Calif., cost $431,000, 23 per cent completed.

Louisville & Nashville

Second Track: In Kentucky, from Ravenna to Millers Creek, 3 miles; from Typo to Domino, 1.6 miles; from North Hazard to Hazard, 0.9 mile.
Other Important Work Under Construction: Second track and grade reduction on Cumberland Valley division including elimination of 725 ft. of tunnel, cost $1,255,000, 90 per cent completed. Construction of yard, 9-stall enginehouse, machine shops, coaling station, other facilities, etc., at Loyal, Ky., cost $593,000, 98 per cent completed. Storage yard at Typo, Ky., cost $407,000, 85 per cent completed. Construction of 9-stall enginehouse, machine shop and other facilities at Hazard, Ky., cost $478,000, 80 per cent completed. Construction of new freight facilities and passenger station, second track, etc., at Hazard, Ky., cost $157,000, 40 per cent completed; 2,500,000-gallon pumping plant and piping, etc., at Dortha, Ky., cost $275,000, 95 per cent completed. Renewal of Alabama bridge at Montgomery, Ala., cost $600,000, 90 per cent completed.

Maine Central

Other Important Work Under Construction: Reconstruction of bridge and abutments at Norridgewock, Me., cost $176,500, completed.

Michigan Central

Other Important Work Under Construction: Grade separation at Detroit, Mich., cost $200,000, completed.

Midland Valley

Other Important Work Under Construction: Enlargement of terminal facilities at Pawhuska, Okla., cost $110,000, completed.

Missouri, Kansas & Texas

First Track: Oklahoma City, Okla., cut-off, 1.26 miles.
Other Important Work Under Construction: New engine terminal and yard extension at Oklahoma City, cost $636,000, completed. New inbound freight house and yard rearrangement at Dallas, Tex., cost $358,000, completed. Raise of grade across San Gabriel river bottom, Circleville, Tex., cost $105,000, 40 per cent completed. Renewal of three bridges and strengthening of others on Neosho division, cost $150,000, 60 per cent completed. Installation of fuel oil storage and delivery facilities on Kansas and Oklahoma lines, cost $333,000, 80 per cent completed.

Missouri Pacific

Other Important Work Under Construction: Building new concrete and reservoir pipe line and other facilities at Wagstaff, Kan., cost $128,000, completed. Reconstruction of yard tracks to replace those destroyed by flood at Pueblo, Colo., cost $112,000, completed. Filling in of bridge 162 at Yellville, Ark., cost $225,500, completed. Filling in bridge 138 at Crickett, Ark., $158,000, 60 per cent completed. Construction of a 100-ft. turntable, addition of two stalls and extension to eight in roundhouse, and other facilities at Coffeyville, Kans., cost $112,000, 50 per cent completed. Construction of river bank protection at Myrick, Mo., cost $100,000, completed.

Mobile & Ohio

Other Important Work Under Construction: New freight office and warehouse at East St. Louis, Ill., cost $151,898, completed.

Moore Haven & Clewiston

First Track: Moore Haven, Fla., to Clewiston, 14.5 miles.

Nashville, Chattanooga & St. Louis

Other Important Work Under Construction: Engine terminals, improved passenger and freight facilities at Hollow Rock Junction, Tenn., cost $580,000, 90 per cent completed.

Newburgh & South Shore

Third Track: In Ohio out of Cleveland, 0.95 mile.
Fourth Track: In Ohio out of Cleveland, 0.68 mile.
Other Important Work Under Construction: Car repair shops and facilities at Cleveland, cost $275,000, completed.

New Holland, Higginsport & Mt. Vernon

First Track: Wenona, N. C., to New Holland, 35 miles.

New York Central

Other Important Work Under Construction: Renewal of stokers at Yonkers power station, Glenwood, N. Y., cost $125,000, completed. Mail service and office building at New York, cost $4,144,190, 93 per cent completed. Coaling plant and ash conveyor at Wayneport, N. Y., cost $177,000, completed. Thirty-stall engine house and terminal facilities at Solvay, N. Y., cost $1,700,000, completed. Reinforced concrete arch highway under crossing at Martisco, N. Y., cost $136,000, completed. Depot road subway at Harbor Creek, Pa., cost $110,000, 75 per cent completed. Subway at Water street, Wesleyville, Pa., cost $229,285, 90 per cent completed. Grade separation at Detroit, Mich., cost $263,621, 60 per cent completed.

New York, New Haven & Hartford

Other Important Work Under Construction: Installation of pipe flume at power house at Cos Cob, Conn., cost $100,000, completed. Westbound running track from Bradford to Westerly, R. I., cost $120,000, 93 per cent completed. Relocation of track, East Providence, R. I., cost $108,985, 90 per cent completed. Rearrangement of yard tracks at Hartford, Conn., cost $132,403, 46 per cent completed. Construction of 3-mile telephone line, yard offices, signal towers, miscellaneous buildings and yard tracks, etc., in Cedar Hill freight terminal, New Haven, Conn., cost $309,228, completed. Enlargement of machine shop; rearrangement and installation of machinery at Cedar Hill, cost $152,700, completed. Miscellaneous yard track and other facility extensions, including land requirements for Northup avenue terminal, Providence, R. I., cost $394,015, completed.

Norfolk Southern

Other Important Work Under Construction: Grade and line revision at various points along the line, cost $400,000, completed.

Northeast Oklahoma

First Track: Near Picher, Okla., 3 miles.

Norfolk & Western

First Track: From Lenore, W. Va., to terminus, 18 miles.
Other Important Work Under Construction: Installation of 2,000,000-gallon water supply, reservoir and pumping unit at Roanoke, Va., completed. Construction of timber preserving plant at Radford, Va., completed. Additional passing tracks at Bluefield, W. Va., completed. Renewal of bridge across Pennsylvania yards at Columbus, Ohio, completed. Improvement and betterments to coal property for fuel purposes near Williamson, W. Va., cost $262,000, work now under way.

Northern Pacific

Second Track: Helena, Mont,, to Great Northern crossing, 2.9 miles.

Northern Pacific Terminal of Oregon

Other Important Work Under Construction: New engine terminal and other necessary facilities at Portland, Ore., cost $400,000, 15 per cent completed.

Oklahoma-Southwestern

First Track: Bristow, Okla., to Nuyaka, 24 miles.
Other Important Work Under Construction: Building from Nuyaka, Okla., to Okmulgee, 12 miles; projected, Okmulgee to Shawnee, 50 miles.

Omaha, Lincoln & Beatrice

Other Important Work Under Construction: New lines projected from Lincoln, Nebr., to Beatrice, 40 miles, cost $2,000,000, and from Lincoln, Nebr., to Omaha, 55 miles, cost $2,500,000, 20 per cent completed.

Oneida & Western

First Track: From Stockton, Tenn., to Doss Spur, 6 mlies.

Oregon & California

Other Important Work Under Construction: Construction of single track tunnel to eliminate curves and trestle near Willamette river at Elk Rock, Oregon, cost $219,000, completed.

Oregon Short Line

First Track: From Strachan, Idaho, to Conda, 7.54 miles.
Other Important Work Under Construction: Installation of tie and timber treating plant at Pocatello, Idaho, cost $326,000, 80 per cent completed.

Oregon-Washington Railroad & Navigation

Other Important Work Under Construction: Extension of Albina yard at Portland, Ore., cost $168,000, 99 per cent completed. Renewal of bridge at Chatcolet, Idaho, cost $136,800, 99 per cent completed. Reconstruction of yard tracks and building of new depot yard office and other facilities at Reith, Ore., cost $167,000, completed. Building new yard tracks and office at Huntington, Ore., cost $113,000, completed. Renewal of main line bridges between Gibbon and Cayuse, Ore., cost $110,000, completed.

Pacific Electric

First Track: In Long Beach, Calif., 1.53 miles.

Pearl River Valley

First Track: In Mississippi, between mile posts 14 to 17, 2.4 miles.

Pennsylvania Railroad

Other Important Work Under Construction: Building from Chester, W. Va. to Raccoon Creek, Pa. (Central region), 12.66 miles.

Pere Marquette

Other Important Work Under Construction: Building Flint Belt railroad in Michigan, 8.2 miles. Engine terminal and yard facilities at New Buffalo, Mich., cost $700,000, completed. Engine terminal at Plymouth, Mich., cost $400,000, completed. Engine terminal at Saginaw, Mich., cost $980,000, completed. Storehouse at Grand Rapids, Mich., cost $125,000, 90 per cent completed.

Philadelphia & Reading

Third Track: East of Womelsdorf, Pa. 0.35 mile.
Other Important Work Under Construction: Concrete arch bridge over Schuylkill river at Philadelphia, Pa., cost $1,100,000, completed. New county bridge at Conshohocken, Pa., cost $240,000, completed. Double track bridge over Susquehanna river at Harrisburg, Pa., cost $1,703,000, 52 per cent completed. Opening Tulip and Emerald streets in Philadelphia, under tracks of Richmond Branch, cost $350,000, 97 per cent completed. Installation of double track bascule bridge at Darby Creek, $222,000, 55 per cent completed. Construction of 11 bridges at Harrisburg, Pa., cost $1,107,000, contracts awarded. Grade elimination and new station facilities at Swatara, Pa., cost $169,000, work started. Double track through truss draw span with 5 deck plate girder approaches at Atlantic City, N. J., cost $328,100, contract awarded.

Pittsburgh & Lake Erie

First Track: Shaw Junction, Pa., to Walford, 3.29 miles.

Pittsburgh & West Virginia

Other Important Work Under Construction: Building new branch line into coal field from Virginia, W. Va., to Bellfield, Pa., 3.2 miles, cost $382,000, 50 per cent completed.

Port Bolivar Iron Ore

Other Important Work Under Construction: New line under survey from Ero, Tex., to junction with the Missouri, Kansas & Texas, 8 miles.

Potato Creek

First Track: Keystone, Pa., to Hamlin, 2.23 miles.

Richmond Belt

First Track: In Richmond, Calif., 0.83 mile.

Roaring Fork

Other Important Work Under Construction: Building from Blackwood, Va., to Black Creek mines, 0.5 mile.

St. Louis, Kennett & Southeastern

First Track: From Kennett, Mo., east, 3.5 miles.
Other Important Work Under Construction: Building new line from Kennett, Mo., to Dearing, 9 miles.

St. Louis-San Francisco

Second Track: Sleeper, Mo., to Lebanon, 8.7 miles; Olathe, Kans., to Spring Hill, 9.65; Amory, Miss., to Aberdeen Junction, 0.8 mile.

St. Louis Southwestern

Other Important Work Under Construction: New yard and engine terminal at Hodge, Tex., cost $235,000, completed.

St. Paul Union Station

First Track: In St. Paul, Minn., 3 miles.
Other Important Work Under Construction: New union station in St. Paul, Minn., cost $15,000,000, 50 per cent completed.

San Francisco Oakland Terminal

Second Track: In California, not specified, 1.19 miles.

Sewell Valley

First Track: From Rainelle Junction, W. Va., to Rupert, 8 miles.
Other Important Work Under Construction: Building from Rupert, W. Va., to Glencoe, 4 miles. New line under survey from Rupert, W. Va., to Duo, 11 miles.

Sierra Company of California

Other Important Work Under Construction: Completion of connecting lines in the Turlock and Modesto irrigation districts, California, of 7.75 miles at one location, and 2 miles on another now operated by this road, and ultimately to be taken over.

Southern Pacific

Other Important Work Under Construction: Renewal of bridge over Willamette river, Albany, Ore., cost $198,000, completed. Construction of concrete reinforced warehouse and tracks to serve at San Francisco, Calif., cost $1,620,000, completed. Line changed near Tehachapi Pass in the Coast Range mountains to eliminate two tunnels between Marcel and Cable, Calif., cost $115,000, completed. Enlarging and lining with concrete, 16 tunnels under Tehachapi mountains between Bakersfield and Tehachapi, Calif., cost $1,000,000, completed. Texas lines: New coach and paint shop at Houston, Tex., and extension to transfer table, cost $217,700, completed. Rein-

forced concrete storehouse and office building at Houston, Tex., cost $150,000, completed. Reconstruction of Pier A and part of Pier B, conveyor gallery and sheds at Galveston, Tex., cost $150,000, 85 per cent completed. Replacing wooden floor and wooden bulkhead on Pier B with concrete floor and retaining walls, also replacing water mains in bay at Galveston, Tex., cost $150,000, completed.

Tampa Southern

First Track: From Ellenton Belt Line in Florida, 15.6 miles.

Terminal Association of St. Louis

First Track: At Big Bend Quarry, Mo., 0.59 mile.

Texas & Pacific

Other Important Work Under Construction: Renewal of draw span over Bayou Plaquemine with double track single leaf lift span, cost $225,000, 25 per cent completed.

Texas Midland

First Track: From Commerce, Tex., to Greenville, 14 miles.

Texas, Oklahoma & Eastern

First Track: From Broken Bow, Okla., to Oklahoma—Arkansas state line, 15.66 miles.

Uintah Railway

Other Important Work Under Construction: New line under survey from Watson, Utah, to Bonanza and Cowboy, 24.96 miles.

Union Pacific

First Track: From Haig, Nebr., to Nebraska—Wyoming state line 14.06 miles. From Nebraska—Wyoming state line to near Yoder, Wyo., 13.57 miles. From Evanston, Wyo., to Wyoming—Utah state line, 3.37 miles. From Wyoming—Utah state line to Wahsatch, Utah, 1.82 miles.

Second Track: LeRoy, Wyo., to Wyoming—Utah state line, 29.13 miles. From Wyoming—Utah state line to Wahsatch, Utah, 7.69 miles.

Other Important Work Under Construction: Building new road from near Yoder, Wyo., to end of track, 2.75 miles, and from near Yoder, down Cherry Creek Valley, 13.2 miles. Installing concrete lining and extending concrete portals at Hermosa tunnel, Wyo., cost $372,500, completed. Additional yard tracks at Council Bluffs, Iowa, cost $324,515, completed.

Union Traction

First Track: At Muncie, Ind., 0.27 mile.

Virginian Railway

First Track: From Maben, W. Va., to Polk Gap, 5 miles.

Second Track: In West Virginia, 2.72 miles.

Other Important Work Under Construction: Building new line from Polk Gap, W. Va., to Glen Rogers, 9.45 miles. Extensions and alterations to engine house at Elmore, W. Va., cost $133,000, completed.

Washington, Brandywine & Point Lookout

Other Important Work Under Construction: Building from Mechanicsville, Md., to Hollywood, 12 miles.

Waterloo, Cedar Falls & Northern

Other Important Work Under Construction: Building new concrete arch bridge and relocation of track at Waterloo, Iowa, terminals, cost $100,000, 85 per cent completed.

Western Maryland

Second Track: Charlton, Md., to Clearspring, 2.3 miles.

Other Important Work Under Construction: Dredging 32 ft. channel to new government channel at Port Covington, Md., cost $160,000, 70 per cent completed. Extension and improvements to grain elevator at Port Covington, Md., cost $1,000,000, 35 per cent completed. Conveyor loading equipment at Port Covington, cost $352,000, 98 per cent completed. Reconstruction of coal pier at Port Covington, cost $700,000, completed.

Wheeling & Lake Erie

Other Important Work Under Construction: New yards, roundhouse and turntable, etc., including steel and frame viaduct at Gambrinus, Ohio, cost $540,750, 95 per cent completed. New yards, roundhouse, turntable and other facilities, etc., including highway change at Jewett, Ohio, cost $494,825, 80 per cent completed.

Wichita Falls, Ranger & Ft. Worth

Other Important Work Under Construction: Building from Breckenridge, Tex., to Jimkurn, 9.2 miles.

Wichita Falls & Southern

First Track: Newcastle, Tex., to Jimkurn, 40 miles.

Winchester & Western

First Track: Between Intermount and Wardensville, W. Va., 5 miles.

Other Important Work Under Construction: Building from Wardensville, W. Va., to Baker, 12 miles.

Railroad Construction in Canada in 1921

Alberta & Great Waterways

First Track: In Alberta, from mile post 272.1 to 282.8, 10.7 miles.

Other Important Work Under Construction: Reconditioning of track, right-of-way and drainage; new water supplies, etc., $2,000,000, 90 per cent completed.

British Columbia Electric

First Track: In Vancouver, B. C., 0.55 mile.

Canadian National Railways

First Track: In Manitoba, Amaranth north, 17.7 miles. In Saskatchewan, Thunderhill extension, 13.9 miles; Milfort northeast, 23.7 miles; Luck Lake, 15.02 miles; Jackfish Lake, 15.06 miles. In Alberta, Onoway branch, 11.9 miles and in British Columbia, Vancouver Island, 3.1 miles.

Second Track: In Alberta, between Munson and Wayne, 6.57 miles.

Other Important Work Under Construction: Canadian Northern: New terminal facilities and buildings at Nutana, Saskatchewan, $411,050, completed; steel bridge at Saskatoon, Saskatchewan, six 157-ft. spans, cost $340,000, completed; steel bridge across Red Deer river, in Alberta on Medicine Hat branch, cost $326,000, sub-structure, completed; steel bridge across Assiniboine river at Pleasant Point, Manitoba, cost $160,000, 15 per cent completed. Grand Trunk Pacific: new reservoir, dam and pipe line at Melville, Saskatchewan, cost $320,000, completed; salmon wharf and warehouse at Prince Rupert, B. C., cost $750,000, wharf completed, warehouse 15 per cent completed.

Canadian Pacific

First Track: Langdon, Alberta, north (Acme-Empress), 17.3 miles; Weyburn, Alberta (Altawan West), 17 miles.

Other Important Work Under Construction: Building from Russell, Manitoba, northerly, 5.5 miles; Lanigan, Saskatchewan, northeasterly, 0.5 miles; Bassano, easterly, 56 miles, of which 35 miles are graded; Rosetown, southeasterly, 45 miles, of which 41 miles are graded; Archive-Weymark, 25 miles, of which 21 miles are graded; Moose Jaw, southwest (Consul East), 60 miles, of which 31 miles are graded; Leader, southeasterly, 29.5 miles.

Central Canada

First Track: In Alberta, 23 miles.

Dominion Atlantic

First Track: Near Weymouth Mills, Nova Scotia, 2.5 miles.

Esquimalt & Nanaimo

First Track: In Province of British Columbia, 4 miles.

Other Important Work Under Construction: New line under survey from Courtenay to Campbell river, 30 miles; renewal of railway and highway bridge at Victoria, B. C., a joint bridge with the city of Victoria, cost $750,000, foundations about completed.

Grand Trunk—Lines East

Other Important Work Under Construction: Renewal and widening of overhead bridge at Main Street, Toronto, cost $120,000, 80 per cent completed.

Kettle Valley

First Track: South Penticton, B. C., to Dog Lake, 2.4 miles.

Other Important Work Under Construction: Building from Dog Lake to government experimental farm, 16.7 miles.

Pacific Great Eastern

First Track: In British Columbia, from Australian creek to Cottonwood river, 35 miles. From Ft. George to Red Rock creek, 18 miles.

Other Important Work Under Construction: Building new road from Red Rock creek to Cottonwood river, 46 miles. Also projected new lines from Ft. George to Provincial boundary, Peach river district, 426 miles. Main line of this road is now under operation from Squamish to Quesnel, 348 miles, with steel laid to mile post 364, and line graded to mile post 428. Steel has also been laid for 18 miles south of Ft. George, cost of all work, $40,000,000, 90 per cent completed.

Quebec Central

First Track: From Scott Junction, in Province of Quebec, to Diamond Junction, 19.33 miles.

Reid-Newfoundland

First Track: Irvine, N. F., to Topsail, 1.5 miles.

Temiskaming & Northern Ontario

Other Important Work Under Construction: Building new line from Cochrane to Abitibi Canon, 70 miles.

Railroad Construction in Mexico in 1921

First Track: In the state of Durango, from Llano Grande to El Salto, 23.61 miles, and from Los Bancos to Cerro de la Cruz, 17 miles; in the state of Coahuila, from Zaragoza to Santo Tomas, 31.67 miles, and from La Vibora to El Oro, 30.14.

Other Important Work Under Construction: Building new line from El Oro to Sierra Mojada, Coahuila, 9.32 miles; and from Santo Tomas to Villa Acuna, Coahuila, 28 miles; new line under survey from El Salto to Mazatlan, 165 miles; reinforced concrete passenger station at Durango, cost $250,000, 85 per cent completed; reinforced concrete passenger station at Saltillo; reduction of grade between Saltillo and Carneros, in the line between Mexico City, Mex., and Laredo, Tex., old grade 2 per cent, new grade 1.05 per cent, cost $860,470, 35 per cent completed.

Concerning the Contributors in This Number

Co-operation Required From Many Sources to Cover Railway Activities Throughout the World

THIS NUMBER of the *Railway Age* contains several times the amount of material which would be included in the average size technical book. Besides discussing the important developments of an important year on our own railways, the Annual Review Number, this year, for the first time covers practically all of the important countries throughout the world. Articles in a number of this nature require the most extended and painstaking preparation and study.

This year for the first time, also, practically all of the articles are signed. Most of the articles were prepared by the members of the *Railway Age* editorial staff. In not a few cases, however, especially as concerns the foreign railways, it was necessary to go outside of the staff. A few words may not be out of place, therefore, as to why the respective special contributors were selected as being best fitted to discuss the subjects which were assigned to them.

Railway Executives

It would be superfluous to say anything about the four chief executives who have contributed to the opening article entitled, "Railway Executives Review Prospects for 1922" (page 5), **Thomas DeWitt Cuyler,** chairman of the Association of Railway Executives; **Julius Kruttschnitt,** chairman of the Southern Pacific Company; **C. H. Markham,** president of the Illinois Central, and **A. H. Smith,** president of the New York Central, need no introduction to our readers in this country or abroad.

Roberts Walker, in his article on "The Regulation of Security Issues Under Section 20-a" (page 21), has taken what might otherwise be a somewhat heavy subject and has treated it in an unusually interesting manner. Mr. Walker is familiar with the subject because of his relations in a legal capacity with the trust company field. He is also vice-president and a director of the Chicago & Alton. For the purposes of the present study he engaged in a careful investigation of the dockets and procedure in many of the important or typical decisions which have been rendered by the Interstate Commerce Commission in this important new work.

Railway Economists

Dr. Julius H. Parmelee has been a regular contributor to the Annual Review Numbers of the *Railway Age* for several years. Last year his article was entitled "Railway Revenues and Expenses in the Year 1920." This year it is headed "An Analysis of the Railway Statistics for 1921" (page 119). The change in title is significant, for one of the many interesting points brought out in the present article is that relating to the increased and improved railway statistical data which have become available in recent years. Dr. Parmelee, as the director of the Bureau of Railway Economics, is doubtless as close a student of railway economics as any man in the country. For three years after his graduation from Yale he was an instructor in economics at Yale, and since that time he has been engaged in work closely related to that subject.

J. L. Payne, who writes under the head "The Canadian Railways Are in a Bad Way" (page 70), may be presumed to know whereof he speaks. Mr. Payne has his office at Ottawa, Canada, and was formerly comptroller of statistics, Department of Railways and Canals for the Dominion of Canada. He has been a keen student of railway affairs in Canada. For several years he has furnished special articles for our Annual Review Number and on other occasions he has discussed in the columns of the paper the performance of the Canadian railways and the tendencies in the Canadian railway situation. Mr. Payne has a happy way of developing the salient features and presenting them in a most readable manner.

Opinions About Mexico

Our plans for an article on Mexico were slightly upset at almost the last minute, but with the aid of Messrs. Titcomb, Pyeatt and Fay we were able to make up the deficiency —in a commendable manner, we should say, if we thought our readers would pardon such a departure from editorial modesty. The article entitled "Mexico Makes Progress Toward Rehabilitation" (page 73), discusses less the actual conditions within Mexico than the restored relationships between the Mexican and United States lines. This very important angle of the situation is "covered" with the assistance of the three railway executives above named who are closely in touch with the Mexican roads.

H. B. Titcomb recently succeeded the late Epes Randolph as president of the Southern Pacific of Mexico and the Arizona Eastern. He is naturally much interested in the Mexican situation and has made a study of it as a part of his new work.

J. S. Pyeatt has been at the head of the Gulf Coast lines for many years. During the period of federal control, he was federal manager of the St. Louis-San Francisco and also various lines in Texas.

Thornwell Fay, executive officer for the receiver of the International & Great Northern may, like Mr. Pyeatt, be expected to be informed concerning our Mexican railway relationships, because his line, like the Gulf Coast Lines, interchanges freight with the National Railways of Mexico and operates a through passenger service in connection with the Mexican system.

Our European Writers

M. Peschaud, who points out the "High Lights on the French Railway Situation" (page 81), is secretary of the Paris-Orleans Railway. He has had a broad experience in railway affairs and has written a number of articles for French, English and American papers on the French railways. He has also written a book on the French railways during the war which has been very well received.

The article on Italy, "A Review of the Italian Railway Situation" (page 85), is written by **A. Giordano,** the *Railway Age's* special news correspondent at Rome, Italy. He follows railway and industrial conditions closely.

Julian Grande, who discusses "The Swiss Railways in the Year 1921" (page 88), is a railway news specialist with headquarters at Geneva, Switzerland. He is a correspondent for several very important newspapers and publications, among them the *Railway Age.*

Dr. J. M. Goldstein, who says that the "Soviets Demoralize Already Inadequate Systems" (page 91), was formerly professor of economics at the Institute of Industry and Trade at the University of Moscow. Before the war he served as an economic adviser to various branches of his government. He was a member of Kerensky's railway mission to the United States. Since the triumph of the Bolsheviki he has devoted himself continuously to a study of American railways. In the *Railway Age* of November 5 was published an article by him showing the important part played by the railways in increasing the population and wealth of the United States.

G. Reder, whose article is entitled "German Railways Operating Under Great Difficulties" (page 93), is associated with the Verein Deutscher Ingenieure, the principal engineering society of Germany, with headquarters at Berlin. His work keeps him in close touch with the railway and engineering conditions in Germany.

American Ideas About Japan's Railways

B. B. Milner, who makes "Some observations on the Japanese Railways" (page 101), received his early training on the Pennsylvania Railroad. He later went with the New York Central, finally becoming chief mechanical engineer of that system. On the Pennsylvania Railroad, in particular, he received an experience covering not only mechanical but engineering and operating matters; he also gave considerable attention to questions of operation while he was with the New York Central. A little more than a year ago he went Tokyo, Japan, to become associated with the Frazar importing and exporting interests. Recently he returned to this country for a few months, but expects shortly to again return to Japan. Mr. Milner is a keen observer. He is not satisfied with noting practices and performances which differ from our own but insists upon determining the reasons for the difference, and in a country like Japan this feature of an observer's attitude is of no slight importance.

Writers on Australia and South Africa

F. M. Whyte, who writes the article on "Unifying the Railway Gages of Australia" (page 107), was for many years connected with the New York Central as chief mechanical engineer and later with the Hutchins Car Roofing Company as vice-president. He went to Australia about a year ago to act as a member of the Uniform Gage Commission, the function of which was to study conditions on the Australian railroads and to make recommendations for a plan looking to the standardization of gages. This is a very important problem in Australia and a solution of it is desired that traffic might be interchanged more efficiently and economically across the boundary lines of the several states of Australia. The findings of the Commission were approved and work will undoubtedly be started shortly to make them effective. Mr. Whyte has only recently returned to this country.

M. T. Griffin, who covers the subject "South African Railways Progress Despite Deficits" (page 111), is one of the staff of the National Bank of South Africa. His headquarters are in New York. His time is devoted to the study of economic conditions in this country and in South Africa, in connection with which he has paid particular attention to railway problems.

Many Furnished Statistical Material

The *Railway Age* must also take this opportunity to thank hundreds of others of its friends in the railway and railway supply fields who have assisted it in furnishing material in order to make its statistics for the year complete. It is only through such co-operation that an issue of this kind is made possible.

Photo Copyright by Ewing Galloway

The Railway Station at Lourenço Marques, Portuguese East Africa

General News Department

The Savannah (Ga.) Local Committee of the Signal Section of the American Railway Association will hold its next meeting on January 19, 1922, at which it is expected that the principal speaker will be H. S. Balliet (N. Y. C.), New York City, secretary of the Signal Section.

L. A. Downs, vice-president and general manager of the Central of Georgia, and chairman of Division IV of the American Railway Association, has been appointed a delegate of that association to attend the Congress of the International Railway Association at Rome, Italy, in April next.

A preliminary compilation of the reports of 193 Class I railroads to the Interstate Commerce Commission of revenues and expenses for the month of November shows a net railway operating income for these roads of $65,741,000, as compared with $50,502,000 for November, 1920. The operating revenues were $462,000,000, as compared with $589,000,000, while the operating expenses were $366,000,000, as compared with $511,000,000.

A rear collision of southbound local passenger trains on the Ninth Avenue Elevated line of the Interborough Rapid Transit Company, New York City, near Fortieth street, Manhattan, on the evening of December 30, resulted in the fatal injury of one passenger and less serious injury to 35 passengers and two employees. The leading train was at a standstill; and two cars of the following train were badly crushed.

Labor Board Files Motion to Dismiss Pennsylvania Injunction

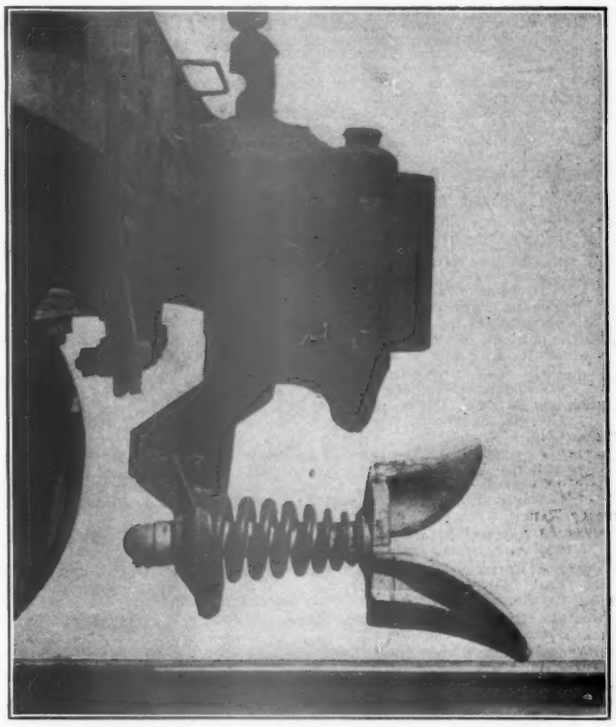
Hearings in the jurisdictional dispute between the Pennsylvania and the Railroad Labor Board, scheduled for January 3 in the United States District Court at Chicago, were again postponed by mutual agreement until January 18. The progress of this dispute was described in the *Railway Age* of December 17, page 1216, and December 24, page 1267. On January 3, John V. Clinnin, assistant United States district attorney, acting as counsel for the Board, filed a motion to dismiss the case, and the arguments on this plea will be heard on January 18.

I. C. C. Authorizes Common Officers and Directors Temporarily

Because it has not been able to act by the last day of the year on all the applications filed with it under paragraph 12 of section 20-a of the interstate commerce act, by officers and directors of more than one railroad for authority to retain their positions, the Interstate Commerce Commission on December 31 issued a blanket order applying to the applications filed, but on which no order had been issued by the commission, authorizing the persons involved to hold their positions as described in the applications until the further order of the commission, on the ground that it appears that neither public nor private interests will be adversely affected thereby. The law provides that no person shall hold positions as officer or director of more than one railroad after December 31, 1921, except upon the authorization by the commission. The commission has already issued orders in a large number of cases, in most of which it has given the authority asked for, but a very large number of applications were received during the last days of the year. The orders heretofore issued have specifically authorized common officers and directors among subsidiary and affiliated companies, but in a few cases of directors of a number of competing roads, the commission has required them to elect which directorships they will retain. The commission also made public on December 31 an order authorizing common officers and directors among the subsidiary and affiliated companies of the Chicago, Burlington & Quincy system.

The Robinson Connector

Our attention has been called to an error in the article entitled "The Development of the Robinson Connector" which was published in the *Railway Age* of December 24, 1921, page 1259. This article referred to the pin and funnel type as the first design of the Robinson connector. In



The First Design of the Robinson Connector, Type A

reality the first design was the type A with wing type gathering arrangement, as illustrated. This was applied on the lines of the Washington Terminal Company and was also tested by the Interstate Commerce Commission on the Great Northern, the trial of the pin and funnel design being incidental thereto. The conclusions in the report of the commission referred to the type A and not to the pin and funnel type as the article indicated.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next meeting, May 9-12, 1922, Hotel Washington, Washington, D. C. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams St., Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 28 and 29, Minneapolis, Minn.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 23-25, 1922, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Annual meeting, November, 1922.

Division I—Operating.

Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section. J. C. Caviston, 75 Church St., New York.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), J. C. Caviston, 75 Church St., New York, N. Y.

Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y. Next meeting, March 21-23, Richmond, Va. Annual meeting, September 20-22, 1922, Colorado Springs, Colo.

Safety Section. J. C. Caviston, 75 Church St., New York.

Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III—Traffic, J. Gottschalk, 143 Liberty St., New York.

Division IV—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Next convention, March 14-16, Chicago. Exhibit of National Railway Appliances Association, March 13-16.

Construction and Maintenance Section. E. H. Fritch.

Electrical Section. E. H. Fritch.

Signal Section (including former activities of the Railway Signal Association). H. S. Balliet, 75 Church St., New York, N. Y. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.

Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.

Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association). J. P. Murphy, General Store Keeper, New York Central, Collingwood, Ohio.

Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, Central of Georgia, Savannah, Ga. Annual meeting, May 10-12, 1922, Denver, Colo.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 14-16, Chicago. Exhibit by National Railway Appliances Association, March 13-16.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 4600 Prospect Ave., Cleveland, Ohio. Annual convention, September 25-30, 1922, Detroit, Mich.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June, 1922, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

Railroad Division, James Partington, American Locomotive Co., 30 Church St., New York.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis. Next meeting, January 24-26, Hotel Sherman, Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific R. R., St. Paul, Minn. Next meeting, May 17-19, 1922, Montreal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. J. Higgins, American Valve & Meter Company, 332 S. Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrooke St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in January, March, May, September and November, Hotel Iroquois, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesan Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C. Annual meeting May 11, 1922, Railroad Club of New York.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1922, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 326 W. Madison St., Chicago. Meeting with International Railway Fuel Association.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R. Room No. 19, Union Pacific Bldg., Kansas City, Mo. Annual convention, 1922, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 23-26, 1922, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo. Annual meeting, January 26 and 27, Hotel Sherman, Chicago.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 10-12, Philadelphia, Pa.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition, March 13-16, Chicago, at convention of American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria, New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va. Next meeting, October 10-13, 1922, Pittsburgh, Pa.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV., Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A., Division V.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.

RAILWAY TREASURY OFFICERS ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Annual convention, September 12-14, 1922, Cleveland, Ohio. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, Marine Trust Building, Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

The Chicago, Rock Island & Gulf will open an office in the Central Trust Building, San Antonio, Tex., with D. O'Leary in charge as general agent.

The San Antonio Traffic Club has been organized at San Antonio, Tex., and the following officers have been elected: President, R. H. Schultz, traffic manager, San Antonio, Uvalde & Gulf; vice-president, Wallace Carnahan; and secretary and treasurer, R. L. Gohmert; directors: S. B. Weller, F. L. Orr, J. E. Pennington, Fred E. Jones, and U. S. Pawkett.

At the annual meeting of the Traffic Club of Lansing, Mich., held on December 14, the following officers were elected: President, H. E. McGiveron, traffic manager, Motor Wheel Corporation; vice-president, E. L. Jennings, agent, Michigan Central; secretary-treasurer, J. I. Ross, traffic commissioner, Lansing Chamber of Commerce; executive committee, W. G. Davis, traffic manager, Auto Body Company; W. K. Andrews, agent, Pere Marquette; C. R. Morris, secretary, Michigan Screw Company; and J. T. Van Nordstrand, agent, American Railway Express Company.

Coal Production

A feeble increase during the week of December 24 failed to lift production of soft coal out of the state of profound depression which has persisted since mid-November, says the weekly bulletin of the Geological Survey. The total output is estimated at 7,468,000 net tons, an increase of 5 per cent over the week preceding. The average daily output for December has been 1,210,000 tons, barely 60 per cent of that in December, 1920. It is even 12 per cent below the daily average in December, 1914, the lowest in any winter of the eight years over which records of current output extend.

Differential Fares, New York-Chicago

The Erie Railroad announces that the Interstate Commerce Commission has accepted tariffs filed by it, and already in effect, establishing differential fares of $2 between New York and Chicago, Cincinnati and Indianapolis; between New York and St. Louis, $2.50, and between New York and Cleveland $1 less than the fares over the Pennsylvania, the New York Central, and other roads. This reduction, added to that resulting from the elimination of the transportation tax, brings these fares down from $2.61 to $5.51 below those charged before January 1.

National Conference on Agricultural Problems

At the request of President Harding, Secretary Wallace, of the Department of Agriculture, is to call a national conference to consider the agricultural problems of the American people, to be held probably in Washington at an early date as yet to be fixed. The President said he was convinced that such a conference may be made a very helpful agency in suggesting practical ways of improvement, particularly if brought into co-ordination with the investigation which has been begun by the Congressional committee committed to a related work. He said that such a conference might divide itself into two parts, one to give consideration to present day difficulties, and the other part a survey of the future in an effort to determine upon general policies, having in view the maintenance of production, the greatest possible use, and at the same time the conservation of agricultural resources, and the more complete co-ordination of agricultural, manufacturing and general business interests. The President suggested that those invited to the conference shall not only include the ablest representatives of agricultural production, but also those who are engaged in industry most intimately associated with agriculture. It is understood that the relations of transportation to agriculture will constitute an important topic to be discussed and that representatives of the railroads will be invited to attend.

Equipment and Supplies

Freight Cars

THE NATIONAL RAILWAYS OF MEXICO are inquiring for 1,000 narrow gage box cars of 30-ton capacity.

THE CENTRAL VERMONT, in the near future, expects to have repairs made to 1,000 box cars and 200 coal cars.

THE PACIFIC FRUIT EXPRESS, in the near future, expects to ask for prices on from 2,500 to 3,000 refrigerator cars.

THE SEABOARD AIR LINE reported in the *Railway Age* of December 17, as inquiring for prices on 1,500 ventilated box cars of 40 tons capacity; 200 flat cars with steel underframes of 40 tons capacity, and 300 steel phosphate cars of 50 tons capacity, has given an order to the Chickasaw Shipbuilding Company for some of these cars, the exact number to be determined later.

THE ILLINOIS CENTRAL is expected to place contracts for 2,000 gondola cars during the first part of the week of January 8, and the Great Northern and the Chicago, Burlington & Quincy, it is expected, will let contracts for other equipment during the latter part of the month. The Burlington is in the market for 7,300 freight cars of various types, but it is anticipated that orders will not be placed for all of them at once. The Great Northern is expected to award contracts for 3,500 cars about the middle of the month.

Passenger Cars

THE STATEN ISLAND RAPID TRANSIT RAILWAY, in the near future, expects to ask for prices on 50 steel cars for passenger service.

Iron and Steel

THE NEW YORK CENTRAL LINES' order for 125,000 tons of rail, reported in the *Railway Age* of December 10, was distributed as follows: Illinois Steel Company, 34,000 tons; Carnegie Steel Company, 16,500 tons; Lackawanna Steel Company, 51,500 tons; Inland Steel Company, 8,000 tons; Bethlehem Steel Company, 6,000 tons, and Algoma Steel Corporation, 9,000 tons.

THE PENNSYLVANIA RAILROAD has placed orders for 80,000 tons of rail, most of which will be in 130 lb. sections, for 1922 delivery as follows: Carnegie Steel Company, 40,000 tons; Bethlehem Steel Company, 18,000 tons; Cambria Steel Company, 18,000 tons; Lackawanna Steel Company, 4,000 tons. In addition the company has unfilled orders from 1921 and rail on hand totaling 74,000 tons and this with the new orders gives the company a total of 154,000 tons available for use in 1922. The company also has some used rail which will be available for branch line or for less important track service.

Signaling

THE MISSOURI, KANSAS & TEXAS has ordered the materials required for the installation of automatic block signaling between Vinita, Okla., and Wybark, 60 miles, consisting of 80 style "S" and 2 style "T2" signals, with the necessary relays, circuit controllers, etc., for a complete system of block signaling within this territory. Installation will be made by the railway company's forces.

Machinery and Tools

THE WESTERN MARYLAND is inquiring for machine tools for a rail reclaiming plant.

THE GREAT NORTHERN is inquiring for 1 Niagara (or similar) 12 ft. squaring shears, motor driven and 1 Chicago (or similar) 12 ft. break, motor driven.

Supply Trade News

Charles R. Robinson, until about a year ago vice-president in charge of sales of the Lackawanna Steel Company, Buffalo, N. Y., has been elected vice-president in charge of sales of the rail division of the **Inland Steel Company, Chicago.** Mr. Robinson was formerly with the Inland Steel Company in a sales capacity but resigned 15 years ago to join the Lackawanna company as division manager of sales at Chicago. **Edward M. Adams,** vice-president of the Inland Steel Company, Chicago, has been appointed first vice-president and general manager of sales succeeding G. H. Jones who retired on December 31, and **Walter C. Carroll** has been appointed vice-president in charge of sales' sheet division.

Burton Mudge, president of Mudge & Co., Chicago, dealers in railway specialties, Chicago, has been elected vice-president and a director of the **Pilliod Company,** New York City, manufacturer of Baker locomotive valve gear, which duties he will assume in addition to those with Mudge & Co. Mr. Mudge was formerly connected with the operating departments of the Atchison, Topeka & Santa Fe, the Chicago & North Western, the Fort Worth & Denver City, and the Rock Island. He resigned as assistant to the general manager of the last named road in 1908, to enter the railway supply business and in September of that year organized the firm of Burton W. Mudge & Bro., representing the Commonwealth Steel Co., this company later becoming Mudge & Co.

B. Mudge

David T. Hallberg, assistant general sales agent of the **P. & M. Company,** with headquarters at Chicago, has been promoted to general sales agent, effective January 1, 1922. The duties of general sales agent of the company heretofore had been handled by Fred N. Baylies, vice-president of the company. Mr. Hallberg was born at Ottumwa, Ia., on September 11, 1885. After completing his education in the public schools, he went to Chicago in 1901, and was there employed in the printing industry until he entered the passenger and advertising department of the Santa Fe, in 1905. Later he was appointed western representative of the Santa Fe Employees' Magazine and remained in that position until he entered the service of the P. & M. Company as material inspector in May, 1910, shortly afterward becoming western representative. In January, 1918, he came to Chicago as sales representative, and in June, 1918, he was promoted to assistant general sales agent.

D. T. Hallberg

Railway Construction

Central Building Company.—This company will construct two additional stories to its office building in Seattle, Wash., at an estimated cost of $175,000. This construction work is to be undertaken in connection with the arrangement made by this company and the Northern Pacific which intends to move its western headquarters from Tacoma, Wash., to Seattle, as soon as the additional office space is provided for.

Iberia & Vermillion.—This company has been ordered by the Louisiana Public Service Commission to enlarge its station at Abbeville, La., to repair the same structure, and to construct a passenger waiting shed of not less than 30 ft. in length by the width of the present station, all of which must be commenced by the middle of March, 1922.

Illinois Central.—This company, which was noted in the *Railway Age* of December 24 (page 1286), as receiving bids for the construction of a car repair shed at McComb, Miss., has awarded the contract for this work to Ellington-Miller Company, Chicago. The building will be 600 ft. by 176 ft., with concrete foundation and steel superstructure, and with a cement tile roof. The entire cost is estimated at $140,000. The same company, also noted in the above-mentioned issue as accepting bids for the construction of a frame viaduct over its tracks at Fulton, Ky., estimated to cost $15,000, awarded the contract for the work to Ellington-Miller Company.

Illinois Terminal.—This company has been granted permission by the Interstate Commerce Commission to extend its line from Formosa, Ill., to O'Fallon, a distance of 14 miles. The work is estimated to cost $641,964.

Missouri, Kansas & Texas.—This company has given a contract to the Graver Corporation, Chicago, for the construction of a type "K" ground operated water treating plant at Parsons, Kan. The plant will have a treating capacity of 50,000 gal. of water each hour and a storage capacity at top of main settling tank capable of holding 200,000 gal. of treated water.

Pacific Fruit Express.—This company has awarded a contract to D. W. Wagner, San Francisco, for the construction of a reinforced concrete addition to its ice plant at Calwa, Cal.

Tampa Southern.—This company contemplates the extension of its line from Bradentown, Fla., to Sarasota, a distance of approximately 12 miles. It is expected that work will be started as soon as financial conditions warrant the construction.

Texas-Mexican.—This company contemplates the construction of a station at Mirando City, Tex., to take care of the recently developed oil traffic at that point.

Union Pacific.—This company, in conjunction with the United States Department of Agriculture and the State of Utah will soon construct a large viaduct over its tracks and the Weber river at Riverside (Ogden), Utah, at an estimated cost of $200,000. The structure will be of reinforced concrete, except over the tracks and the Weber river where through truss spans will be built. The cost of the work will be divided among the three parties, the railroad paying one-half of the entire cost of the viaduct, excluding the span across the Weber river. It is expected that bids for this work will be called for during the first part of the coming year, and that the construction will be completed during the summer.

Wabash.—This company contemplates the construction of a station at Centralia, Mo. No definite building plans have as yet been prepared.

Instruction in Traffic Management, for the benefit of large shippers and their traffic men, or clerks, is offered in the "Vocational Department" of the H. G. Williams Company, 25 Beaver street, New York City. One evening a week, for eight months, is the course advertised and the cost is $61; with a cheaper course—for $45—for junior employees. Mr. Williams is editor of the Freight Traffic Red Book.

Railway Financial News

ARIZONA & NEW MEXICO.—*Acquisition.*—See El Paso & Southwestern.

CAROLINA, CLINCHFIELD & OHIO.—*Loan Authorized.*—The Interstate Commerce Commission has approved a loan to this company of $6,000,000 to enable it to pay off a loan of $1,000,000 from the United States and $5,000,000 of its Elkhorn first mortgage gold notes which mature on January 1, 1922. The commission has also authorized the extension of the maturity date of $6,000,000 of the Elkhorn first mortgage gold notes from January 1, 1922, to January 1, 1923, and to pledge them, together with $1,000,000 of first mortgage 5 per cent, 30-year gold bonds with the Secretary of the Treasury as collateral security for the loan. In order to make the Elkhorn gold notes available as collateral it was necessary to extend the maturity date.

CHICAGO & EASTERN ILLINOIS.—*Election for Reorganized Company.*—At a meeting of the provisional board of directors of the Chicago & Eastern Illinois Railway Company in Chicago the following directors were elected for the newly organized company: Gordon Abbott, William H. Coverdale, Frederick H. Ecker, Henry Evans, T. D. Heed, William J. Jackson, F. J. Lisman, William H. McCurdy, George Welwood Murray, John W. Platten, H. H. Porter, John J. Pulleyn, John W. Stedman, Melvin A. Traylor and Edwin W. Winter.

On January 1, 1922, W. J. Jackson, as receiver of the property of the old Chicago & Eastern Illinois Railroad, turned the same over to the new Chicago & Eastern Illinois Railway Company, except the Chicago & Indiana Coal Railway Company, which was not acquired by the reorganized corporation. Mr. Jackson is president of the new corporation.

For the convenience of participants in the reorganization of the Chicago & Eastern Illinois Railroad Company, arrangements have been made whereby the United States Mortgage & Trust Company will purchase and sell scrip certificates for Chicago & Eastern Illinois Railway Company general mortgage 5 per cent bonds, preferred stock and common stock.

CHICAGO, MILWAUKEE & ST. PAUL.—*Asks Authority for Acquisition of Chicago, Milwaukee & Gary.*—This company has applied to the Interstate Commerce Commission for an order approving the acquisition of the Chicago, Milwaukee & Gary by the purchase of its capital stock, also an order authorizing the purchase of the stock and the assumption of liability as guarantor of its bonds, and a certificate of public convenience and necessity for the acquisition of control of the road. The St. Paul is to take over the stock, amounting to $1,000,000, and to guarantee the principal of $5,700,000 first mortgage 5 per cent gold bonds and the interest after January, 1924.

CINCINNATI, INDIANAPOLIS & WESTERN.—*To Operate Part of C. & E. I. Division.*—Beginning January 1, 1922, the Cincinnati, Indianapolis & Western will operate that part of the former Chicago & Eastern Illinois, Brazil branch, between West Union and Brazil, about 29 miles, until January 16, the date set for the sale of the entire Brazil branch at Danville, Ill.

DELAWARE, LACKAWANNA & WESTERN.—*Declares Extra Dividend of 5 Per Cent.*—The directors have declared an extra dividend of 5 per cent and the regular quarterly dividend of 3 per cent, both payable January 20, to stock of record January 7.

See also article in this issue entitled "Dividend Changes on Railroad Stocks in 1921."

EL PASO & SOUTHWESTERN.—*Authorized to Acquire Control.*—The Interstate Commerce Commission has authorized the acquisition of the Arizona & New Mexico by purchase of its capital stock. It has also authorized the El Paso & Southwestern to issue $3,500,000 of promissory notes for two years at 6 per cent, to be delivered directly at par or to be sold at par and the proceeds used in part payment for the stock and bonds of the Arizona & New Mexico. The purchase price is $4,500,000, of which $1,000,000 is to be paid in cash. Acquisition of control of the road by lease is also authorized.

GRAND TRUNK.—*May Appeal Award.*—The Judicial Committee of the Privy Council has granted Sir John Simon, on behalf of the Grand Trunk Railway of Canada, leave to appeal from the recent decision of the Board of Arbitration as to the value of the railroad's property. The Board of Arbitration, of which Chief Justice William Howard Taft was a member, declared in its findings that the common and preferred stocks of the company were valueless. The award was noted in the *Railway Age* of September 10, 1921, page 511.

NORTHERN PACIFIC.—*Asks Authority to Abandon Line.*—This company has applied to the Interstate Commerce Commission for authority to take up and abandon its Boulder-Elkhorn branch in Montana, 19.6 miles.

NORFOLK SOUTHERN.—*Authorized to Abandon Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of the line of the Carthage & Pinehurst from Pinehurst to Carthage, N. C., 12.22 miles.

ST. LOUIS SOUTHWESTERN.—*To Pay Bond Interest.*—Interest amounting to 2 per cent will be paid on January 1, 1922, on the second mortgage 4 per cent gold income bond certificates, due 1989, for the six months ending December 31, 1921, on presentation of coupons. The Committee on Securities of the New York Stock Exchange has ruled that said certificates be quoted ex-interest 2 per cent on Tuesday, January 3, 1922, and that thereafter said certificates, to be a delivery, must carry the July 1, 1922, and subsequent coupons.

SUSQUEHANNA RIVER & WESTERN.—*Proposed Acquisition.*—The Interstate Commerce Commission has issued a decision holding that the proposed acquisition and operation by this company of a line of narrow gage railroad extending from its main line at Bloomfield Junction to Blain, Pa., a distance of 17 miles, is not within the scope of paragraph 18 of section 1 of the Interstate Commerce Act, and the proceeding has been dismissed. No application was filed under section 5 of the act relating to consolidations. The property is now operated by the Susquehanna River & Western.

TENNESSEE CENTRAL.—*Proposed Reorganization.*—See Tennessee Midland.

TENNESSEE MIDLAND.—*Investigation of Reorganization Ordered.*—The Interstate Commerce Commission has ordered an investigation for the purpose of inquiring into all matters involved in the petition filed by Caldwell & Co., reorganization managers, in behalf of the Tennessee Midland, a corporation about to be formed for the purpose of acquiring the Tennessee Central, for approval of a proposed plan of reorganization, a proposed loan from the government and other things. A hearing is to be held at Washington before Examiner J. F. Gray on January 16. Notice of the hearing was ordered sent to the receivers of the Tennessee Central, the officers of various railroads interested in its affairs, attorneys for junior stockholders, the director general of railroads, the chairman of a special committee of the Nashville Transportation Board of Trustees, the mayor of Nashville and the Association of Railway Executives.

WATERLOO, CEDAR FALLS & NORTHERN.—*Asks Loan From Revolving Fund.*—This company has applied to the Interstate Commerce Commission for a loan of $381,347 for 10 years to enable it to meet maturing indebtedness.

WICHITA FALLS, RANGER & FORT WORTH.—*Receivership.*—Frank L. Ketch, of Ardmore, Tex., president of the road and executor of the Hamon estate, and J. W. Mitchell, of Fort Worth, were on December 26 appointed receivers by Judge James C. Wilson, of the United States District Court of the Northern District of Texas, on the application of J. W. Meany, who is seeking a foreclosure of a contractor's lien on the railroad.

Dividends Declared

Atchison, Topeka & Sante Fe.—Common, 1½ per cent, quarterly, payable March 1 to holders of record January 31.

Atlanta & West Point.—Common, 2 per cent, quarterly; preferred, 1¼ per cent, quarterly: both payable January 1.

Delaware, Lackawanna & Western.—3 per cent, quarterly; extra, 5 per cent; both payable January 20 to holders of record January 7.

Pittsburgh & West Virginia.—1½ per cent, quarterly, payable February 28 to holders of record February 1.

Western of Alabama.—3 per cent, payable December 31 to holders of record December 19

Woodstock Railway.—2 per cent.

Railway Officers

Executive

John D. McCartney, assistant general passenger agent of the Central of Georgia, with headquarters at Savannah, Ga., has been promoted to assistant to the president, with the same headquarters. He will have charge of all work connected with public relations and such other duties as may be assigned to him. A photograph and sketch of Mr. McCartney were published in the *Railway Age* of March 18, 1921 (page 741).

John W. Platten, president of the United States Mortgage & Trust Co., New York, has been elected chairman of the board of directors of the Chicago & Eastern Illinois, with headquarters at New York. This action became effective following a meeting held by the board on December 31, 1921, for the purpose of completing the reorganization of the railroad. Other officers elected were: **William J. Jackson,** president; **Will. H. Lyford,** vice-president and general counsel; **Frank G. Nicholson,** vice-president and general manager; **Thomas D. Heed,** vice-president; **Frank Austin,** secretary, and **Jonathan P. Reeves,** treasurer. The board also appointed three additional officers, namely, **Robert F. Brown** and **William A. Ragel,** assistant secretaries, and **Frederick W. Krohn,** assistant treasurer. With the exception of Mr. Platten, all the officers will have their headquarters at Chicago.

Financial, Legal and Accounting

A. J. Raynes, whose appointment as comptroller of the Maine Central was announced in the *Railway Age* of December 24, (page 1291), was born on November 18, 1873, at Yarmouth, Maine. He was educated at high school and business college and entered railway service in December, 1888, as a freight clerk and telegraph operator for the Maine Central. In August of the following year he became a clerk in the office of the auditor of freight accounts. In July, 1904, he was promoted to accountant in the office of the comptroller. Six years later he became chief clerk to the auditor of disbursements. The following year he was appointed auditor of disbursements and, in 1913, to auditor in charge of disbursements and traffic accounts. He served as federal auditor under the Railroad Administration and in March, 1920, became assistant comptroller, in which position he was serving at the time of his recent appointment.

Operating

J. G. June has been appointed superintendent of the Marion division of the Erie, effective January 1.

E. I. Bowen has been appointed superintendent of the Buffalo division of the Erie succeeding J. G. June, transferred, effective January 1.

Traffic

W. W. Schoff has been appointed general agent of the El Paso & Southwestern with headquarters at Cleveland, O.

E. M. Rebard has been appointed assistant traffic manager of the Tonopah & Goldfield with headquarters at Goldfield, Nevada.

E. C. Hoag has been appointed industrial agent of the Union Pacific with headquarters at Omaha, Nebr., effective January 1, 1922.

C. E. Jefferson has been appointed general freight agent of the Canadian Pacific, Western Lines, succeeding W. C. Bowles, promoted.

J. D. Prewett has been appointed commercial agent of the Seaboard Air Line with headquarters at Oklahoma City, effective January 1.

S. G. Reed, whose appointment as assistant to the traffic manager of the Southern Pacific, Texas lines, with headquarters at Houston, Tex., was announced in the *Railway Age* of December 17 (page 1234), was born at Franklin Parish, La., on March 26, 1867. He completed two years work at Colgate University in 1886, and on January 1, 1889, entered railroad service in a local freight office of the New York, Texas & Mexican (Southern Pacific, Atlantic System). On January 1, 1892, he was appointed chief clerk to the general freight and passenger agent at Victoria, Tex., which position he held until November 1, 1905, when he was promoted to division freight and passenger agent of the Louisiana division, with headquarters at Lake Charles, La. He was transferred to Dallas, Tex., on October 1, 1906, and on September 1, 1912, he was promoted to assistant general freight and passenger agent, with the same headquarters. He was appointed land and tax agent on September 1, 1918, with headquarters at Houston, Tex., and on March 1, 1920, he became assistant general freight agent, with the same headquarters, which position he was holding at the time of his recent promotion.

Mechanical

J. E. Stevens has been appointed master mechanic of the Mobile & Ohio, with headquarters at Murphysboro, Ill., succeeding B. A. Orland, assigned to other duties.

Engineering, Maintenance of Way and Signaling

J. B. Emerson, assistant engineer of tests of the rail committee of the American Railway Association, with headquarters at Chicago, has been promoted to engineer of tests, with the same headquarters, succeeding M. H. Wickhorst, resigned.

Alvin Chase Harvey, whose appointment as assistant chief engineer of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, was announced in the *Railway Age* of December 24 (page 1292), was born at Mansfield, New York, on December 24, 1883. After graduating from Purdue University in June, 1908, he entered the service of the New York, Chicago & St. Louis as a rodman on station ground surveys between Cleveland, Ohio and Buffalo, N. Y. In March, 1909, he was promoted to assistant engineer in charge of the east side grade crossing elimination work at Cleveland. One year later he was given charge of double track survey between Brocton, N. Y., and Erie, Pa., and in May, two months later, he was put in charge of the track elevation work at Grand Crossing, Chicago, Ill. In June, 1916, he was appointed assistant engineer in charge of the field work on the Ivanhoe Road grade crossing elimination at Cleveland. In January, 1917, he was made field engineer in charge of the field work on the west side grade crossing elimination at Cleveland. He was promoted to engineer of grade crossing elimination, with headquarters at Cleveland, in September, 1918, having charge of both the field and office work, which position he was holding up to the time of his recent promotion.

Purchasing and Stores

W. A. Summerhays, purchasing agent of the Illinois Central, with headquarters at Chicago, has been promoted to lumber and tie agent, with the same headquarters, and he will be succeeded by **J. J. Bennett,** assistant purchasing agent, with the same headquarters.

E. Griffiths, division storekeeper of the Chicago, Milwaukee & St. Paul, with headquarters at Perry, Iowa, has been transferred to Mobridge, S. D., succeeding **G. L. Juel,** who has been transferred to Malden, Wash., succeeding **H. R. Meyer,** who has been transferred to Perry to succeed Mr. Griffiths.

Obituary

F. E. Haff, assistant treasurer of the Long Island, died in New York City on January 2 at the age of 59.